STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: December 13, 2018

FROM: Matt Urban
Chief, Operations Management Section

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT Dredge & Fill Application
Gilford, 42249

TO Gino Infascelli, Public Works Permitting Officer
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Forwarded herewith is the application package prepared by NH DOT Bureau of Highway Design for the subject Major impact project. This project is classified as Major per Env-Wt 303.02(p). The project consists of rehabilitation to three existing corrugated metal structural plate culverts. Location 1 is a 72" CMP carrying an unnamed tributary to Black Brook under US 3 Bypass. Locations 2 and 3 are 84" CMP's carrying an unnamed tributary to Jewett Brook under NH 11A and US3 Bypass. All three culverts will receive a shot-crete invert lining.

This project was reviewed at the Natural Resource Agency Coordination Meeting on November 21, 2018. A draft copy of the minutes has been included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link: http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm

Mitigation is not required for this project as discussed at the Natural Resource Agency Coordination Meeting.

A payment voucher has been processed for this application (Voucher #550815) in the amount of $1,113.80

The lead people to contact for this project are Christopher Carucci, Bureau of Highway Design (271-2731 or Christopher.Carruci@dot.nh.gov) or Matt Urban, Chief Operations Management Section, Bureau of Environment (271-3226 or Matt.Urban@dot.nh.gov).

If and when this application meets with the approval of the Bureau, please send the permit directly to Matt Urban, Chief Operations Management Section, Bureau of Environment.

MRU:mru
Enclosures
cc:
BOE Original
Town of Gilford (4 copies via certified mail)
David Trubey, NH Division of Historic Resources (Cultural Review Within)
Carol Henderson, NH Fish & Game (via electronic notification)
Maria Tur, US Fish & Wildlife (via electronic notification)
Mark Kern, US Environmental Protection Agency (via electronic notification)
Michael Hicks, US Army Corp of Engineers (via electronic notification)
Kevin Nyhan, BOE (via electronic notification)

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NHDES-W-06-012

WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau
Land Resources Management

Check the status of your application: www.des.nh.gov/onestop

RSA/Rule: RSA 482-A/ Env-Wt 100-900

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.:
			Check No.:
			Amount:
			Initials:

1. REVIEW TIME: Indicate your Review Time below. To determine review time, refer to Guidance Document A for instructions.

☒ Standard Review (Minimum, Minor or Major Impact) ☐ Expedited Review (Minimum Impact only)

2. MITIGATION REQUIREMENT:

If mitigation is required a Mitigation-Pre Application meeting must occur prior to submitting this Wetlands Permit Application. To determine if Mitigation is Required, please refer to the Determine if Mitigation is Required Frequently Asked Question.

Mitigation Pre-Application Meeting Date: Month: __ Day: __ Year: ____

☒ N/A - Mitigation is not required

3. PROJECT LOCATION:

Separate wetland permit applications must be submitted for each municipality that wetland impacts occur within.

ADDRESS: **NH Route 11A/US3 Bypass interchange & US 3 Bypass North Terminus**		TOWN/CITY: **Gilford**	
TAX MAP: **N/A**	BLOCK: **N/A**	LOT: **N/A**	UNIT: **N/A**
USGS TOPO MAP WATERBODY NAME: **trib. to Jewett&Black Brooks** ☐ NA		STREAM WATERSHED SIZE: **835 ac,524ac** ☐ NA	
LOCATION COORDINATES (If known): **43.5310, -71.4419 & 43.5657, -71.4338**		☒ Latitude/Longitude ☐ UTM ☐ State Plane	

4. PROJECT DESCRIPTION:

Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

The project involves the rehabilitation of three existing corrugated metal structural plate culverts. Location 1 is a 72" cmp carrying an unnamed tributary to Black Brook under US 3 Bypass. Locations 2 & 3 are 84" cmp's carrying an unnamed tributary to Jewett Brook under NH 11A and US 3 Bypass. All three culverts will receive a shotcrete invert lining. A detailed project description is attached.

5. SHORELINE FRONTAGE:

☒ NA This does not have shoreline frontage. SHORELINE FRONTAGE:

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

6. RELATED NHDES LAND RESOURCES MANAGEMENT PERMIT APPLICATIONS ASSOCIATED WITH THIS PROJECT:

Please indicate if any of the following permit applications are required and, if required, the status of the application.

To determine if other Land Resources Management Permits are required, refer to the Land Resources Management Web Page.

Permit Type	Permit Required	File Number	Permit Application Status
Alteration of Terrain Permit Per RSA 485-A:17	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Individual Sewerage Disposal per RSA 485-A:2	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Subdivision Approval Per RSA 485-A	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Shoreland Permit Per RSA 483-B	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED

7. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:

See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: NHB **18** - **2771** .

b. ☐ Designated River the project is in ¼ miles of: _____ ; and
date a copy of the application was sent to the Local River Management Advisory Committee: Month: __ Day: __ Year: ____
☒ N/A

8. APPLICANT INFORMATION (Desired permit holder)

LAST NAME, FIRST NAME, M.I.: **NH Dept. of Transportation**

TRUST / COMPANY NAME: **NH Dept. of Transportation** | MAILING ADDRESS: **PO Box 483**

TOWN/CITY: **Concord** | STATE: **NH** | ZIP CODE: **03302**

EMAIL or FAX: **Bureau16@dot.nh.gov** | PHONE: **603-271-3226**

ELECTRONIC COMMUNICATION: By initialing here: KoM, I hereby authorize NHDES to communicate all matters relative to this application electronically.

9. PROPERTY OWNER INFORMATION (If different than applicant)

LAST NAME, FIRST NAME, M.I.: **same as applicant**

TRUST / COMPANY NAME: | MAILING ADDRESS:

TOWN/CITY: | STATE: | ZIP CODE:

EMAIL or FAX: | PHONE:

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.

10. AUTHORIZED AGENT INFORMATION

LAST NAME, FIRST NAME, M.I.: | COMPANY NAME:

MAILING ADDRESS:

TOWN/CITY: | STATE: | ZIP CODE:

EMAIL or FAX: | PHONE:

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.

11. PROPERTY OWNER SIGNATURE:

See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance.
8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.
12. The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not forward returned mail.

Property Owner Signature	Print name legibly	Date
	KIRK MUDGETT	12/10/18

MUNICIPAL SIGNATURES

12. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will be reviewed in the standard review time frame.

13. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

⇨ Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

14. IMPACT AREA:
For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact
Permanent: impacts that will remain after the project is complete.
Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.		TEMPORARY Sq. Ft. / Lin. Ft.	
Forested wetland		☐ ATF		☐ ATF
Scrub-shrub wetland		☐ ATF		☐ ATF
Emergent wetland		☐ ATF	2,979	☐ ATF
Wet meadow		☐ ATF		☐ ATF
Intermittent stream		☐ ATF	143 / 20	☐ ATF
Perennial Stream / River	/	☐ ATF	2,081 / 186	☐ ATF
Lake / Pond	/	☐ ATF	/	☐ ATF
Bank - Intermittent stream	/	☐ ATF	/	☐ ATF
Bank - Perennial stream / River	/	☐ ATF	366 / 56	☐ ATF
Bank - Lake / Pond	/	☐ ATF	/	☐ ATF
Tidal water	/	☐ ATF	/	☐ ATF
Salt marsh		☐ ATF		☐ ATF
Sand dune		☐ ATF		☐ ATF
Prime wetland		☐ ATF		☐ ATF
Prime wetland buffer		☐ ATF		☐ ATF
Undeveloped Tidal Buffer Zone (TBZ)		☐ ATF		☐ ATF
Previously-developed upland in TBZ		☐ ATF		☐ ATF
Docking - Lake / Pond		☐ ATF		☐ ATF
Docking - River		☐ ATF		☐ ATF
Docking - Tidal Water		☐ ATF		☐ ATF
Vernal Pool		☐ ATF		☐ ATF
TOTAL	/		5,569 / 262	

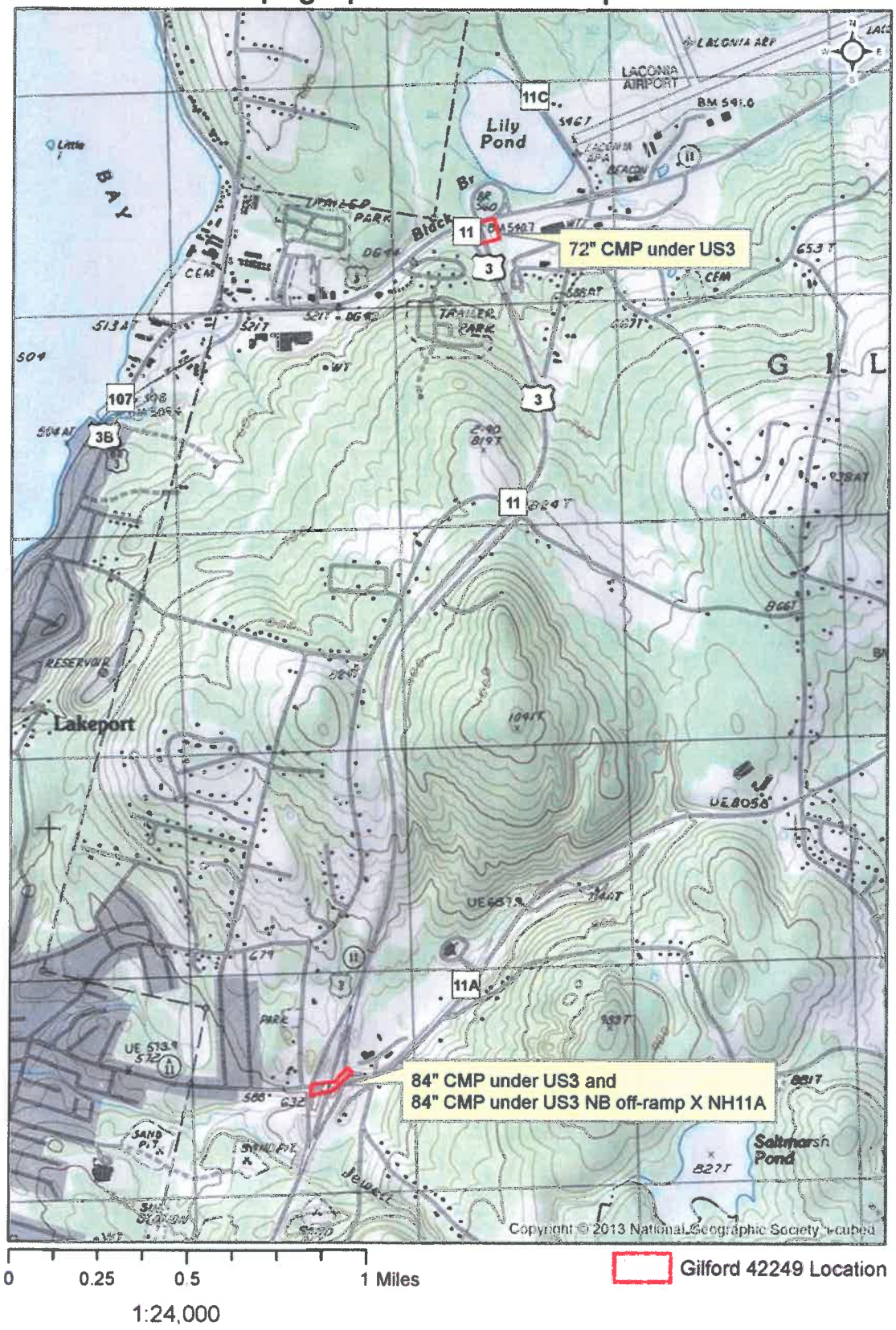
15. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of $ 200

☒ Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking)	**5,569** sq. ft.	X	$0.20 =	**$ 1,113.80**
Temporary (seasonal) docking structure:	sq. ft.	X	$1.00 =	$
Permanent docking structure:	sq. ft.	X	$2.00 =	$
Projects proposing shoreline structures (including docks) add $200 =				$
			Total =	**$ 1,113.80**
The Application Fee is the above calculated Total or $200, whichever is greater =				**$ 1,113.80**

Gilford 42249 Topographic Location Map



CULVERT REHABILITATION

NH Route 3 / NH Route 11 / NH Route 11A

GILFORD, NH

NHDOT PROJECT NO. 42249

SUPPLEMENTAL NARRATIVE

Project Description

The project involves the rehabilitation of three corrugated metal structural plate culverts. The culverts were constructed in 1964 / 1965 and have severely deteriorated inverts. All have mitered ends and existing stone protection at the inlets and outlets. Location 1 carries an unnamed tributary to Black Brook under US 3 Bypass. Locations 2 & 3 carry an unnamed tributary to Jewett Brook under NH 11A and US 3 Bypass. The project is funded under the Federal Culvert Replacement / Rehabilitation and Drainage Repair Program (CRDR). All work will be within the existing ROW or NHDOT owned property.

The proposed treatment for all three culverts is shotcrete invert lining, 4" thick, with steel reinforcement. Incidental work includes resetting existing stone fill at the inlet and outlet of each culvert and replacement of three 12" corrugated metal slope drains in close proximity to the Location 2 and 3 access roads. No new impervious surfaces are proposed.

The existing lengths and slopes of the culverts will be unchanged. The inlet and outlet inverts will be raised by the thickness of the shotcrete invert lining (4") and the existing stone at the inlets and outlets will be reset over a short distance to maintain connectivity.

Existing streambanks are heavily armored. Stones that are moved during construction will be reset once construction is complete. Stones at the culvert inlets and outlets will be reset to make a smooth transition to and from the new concrete inverts. Seeding and mulching will be used as necessary to establish a vegetative cover on disturbed areas above top of bank.

No road closures or other significant impacts to traffic are anticipated to be necessary. The work is expected to take 4 - 6 weeks per location with construction anticipated to begin in the summer of 2019. Some work may occur concurrently at all three locations.

Temporary wetland impacts will result from the construction access roads, slope drain replacement, and resetting of existing stone along the stream banks. Where access roads cross wetlands, the Contractor will be required to use temporary protective measures such as crushed stone on geotextile to minimize disturbance to the soil and plant root systems. Wetland vegetation will be allowed to re-establish naturally.

All three culverts are located within 100 year floodplains (Zone A, no base flood elevation). No fill in floodplains is proposed. No significant change in 100 year flood elevations is anticipated.

Existing Conditions

There are no reports of flooding or damage associated with these crossings. Field review found the culverts still had circular shape, good horizontal and vertical alignment, stable banks, and no evidence of erosion. There was evidence of transport of sand, small gravel, and some cobbles.

Location 1 is 72" diameter x 190' long crossing under US 3 Bypass 250' south of the bridge over NH 11A. Culvert slope is approximately 0.5%. Height of fill over the culvert is approximately 24'. Black Brook is approximately 800' downstream of the culvert outlet.

Location 2 is 84" diameter x 206' long, crossing diagonally under NH 11A 200' east of the Bypass bridge over NH 11A. Culvert slope is approximately 0.9%. Height of fill over the culvert is approximately 12'. Location 3 is approximately 115' downstream.

Location 3 is 84" diameter x 220' long, crossing under US 3 Bypass 150' south of the US 3 Bypass bridge over NH 11A. Culvert slope is approximately 1.6%. Height of fill over the culvert is approximately 31'. Jewett Brook is approximately 1,200' downstream of the Location 3 outlet.

The area surrounding the project includes US Route 3, NH Route 11A, NH 11, and several on and off ramps, as well as mowed field, forested wetland and upland, and emergent and scrub-shrub wetlands. Several businesses are also located in the vicinity of the project. Location 1 is approximately 500' southwest of Lily Pond, which is a Prime Wetland. The project will have no effect on Lily Pond.

Rehabilitation of the 84" pipe immediately downstream of Location 3 is proposed under Project 41655. If funding is available, Project 41655 will be advertised and constructed concurrently with this project. A separate Wetland Permit Application has been submitted for the 41655 Project.

Hydraulic Analysis

Hydraulic analyses of the existing and proposed conditions were conducted to ensure that the conveyance and hydraulic conductivity of the stream crossings are adequate during significant rainfall events. FHWA's HY-8 Culvert Analysis Program was used for hydraulic modelling.

The drainage areas for the 3 culverts were determined from a combination of Streamstats boundaries, survey and lidar contours, and field inspection. They are as follows.

- Location 1: 524 ac, classified as a Tier 2 (Streamstats area was 499 ac).
- Location 2: 829 ac, classified as a Tier 3 (Streamstats area was 698 ac).
- Location 3: 835 ac, classified as a Tier 3 (Streamstats area was 704 ac).

At Location 1, boundary differences were minor resulting in about a 5% increase in area. Flow estimates from Streamstats and FHWA Regression method yielded similar results. Streamstats flows pro-rated for the additional area will be used for analysis.

Q50 = 184 cfs Q100 = 226 cfs

At Locations 2 and 3, Streamstats incorrectly routed approximately 125 acres to the 84" culvert immediately downstream of Location 3. The downstream boundary (858 ac) compared favorably with lidar and field review, and flow estimates from Streamstats and FHWA Regression method yielded similar results. Adjusting flows based on drainage area would result in reductions of about 3% from the Streamstats predictions for the 858 ac area. For simplicity, Streamstats flow estimates for the 858 ac area will be used for analysis of the Location 2 and Location 3 culverts.

Q50 = 268 cfs Q100 = 328 cfs

At Location 1, the existing culvert capacity is limited by available headwater depth. At headwater depth over 5' the adjacent field will flood and flow will bypass to the west along the edge of NH 11 and under the Bypass bridge to the twin 42" pipes crossing under US 3. Existing capacity prior to flooding field is about 111 cfs (just under half of Streamstats Q100). This is not inconsistent with the reported satisfactory performance. Streamstats and other regression methods have wide confidence intervals. Streamstats lower limit flow estimate for this location is 114 cfs. Also note that the field adjacent to the 72" pipe inlet is all within existing R.O.W. and no damage from occasional flooding is anticipated. This culvert operates in outlet control due to the flat slope and high roughness of the structural plate. Smoother concrete on the lower 1/3 of the pipe will offset the reduction in the culvert area caused by the 4" thick concrete lining. Modelling indicated an increase of 0.03' in the Q100 headwater depth as a result of the proposed lining. Q100 outlet velocity increase will by about 0.5 ft/s. Existing streambank stone armor is sufficient to prevent erosion.

The Location 2 and 3 culverts also operate in outlet control due to relatively long lengths, flat slopes, and barrel roughness. They are also influenced by the 84" pipe immediately downstream of Location 3. Hydraulic performance of the rehabilitated downstream culvert, as proposed under Project 41655, was used in analysis of the existing and proposed conditions for the Location 2 and Location 3 culverts. The Location 2 culvert has an existing capacity of about 400 cfs at headwater depth of 15'. The Location 3 culvert has an existing capacity of about 475 cfs at headwater depth of 20'. As noted above, the Streamstats Q100 for the next 84" pipe downstream is 328 cfs. Areas subject to Q100 culvert headwater are all within the existing ROW. Flows significantly higher than Q100 would be required to impact the NH Route 11A travel way. Modelling of the proposed 4" concrete invert lining indicates a reduction in Q100 headwater for both culverts by 8" – 12" and outlet velocity increases of less than 1 ft/s.

The rehabilitated location 2 and 3 culverts were evaluated using the same design flow as the 41655 culvert (Q100 = 328 cfs) and using the rehabilitated ramp culvert as the existing downstream control. These culverts will pass the Q100 and Q50 flows without adverse effects on roadways or upstream development. The shotcrete invert lining increases the capacity and lowers the headwater depths by 8" to 12". Existing streambank stone armor is sufficient to prevent erosion.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

WETLANDS PERMIT APPLICATION – ATTACHMENT A
MINOR AND MAJOR - 20 QUESTIONS

Land Resources Management
Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop

RSA/ Rule: RSA 482-A, Env-Wt 100-900

Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:

1. The need for the proposed impact.

The project is needed to address the deteriorated invert conditions of two existing 84"corrugated metal structural plate culverts and one 72" corrugated metal structural plate culvert. The culverts were constructed in 1964/1965 and have severely deteriorated inverts. All 3 culverts still have circular shape and good horizontal and vertical alignment. Delaying rehabilitation increases the risk of structural deformation, which would require a more costly rehabilitation, and increases the risk of structural failure.

2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.

The following project alternatives were considered:

- Rehabilitation of the existing culverts (proposed action)

- In-Kind Replacement - This alternative would involve substantial excavation and road closures for extended periods of time due to the depth of these culverts. Location 1 has 24' of fill over it and Locations 2 & 3 have 12' and 31' over them respectively. Construction access and staging would involve significantly more wetland impact and more ground disturbance during construction compared to the proposed pipe rehabilitation. Post-construction conditions would be similar to existing conditions, with no improvements to the stream crossing.

- Replacement with larger structures - Similar to in-kind replacement, this alternative would also involve a large amount of excavation and significantly more impacts to the streams and adjacent wetlands during construction. In order to fully address the stream crossing rules, a culvert/bridge span of around 16 feet would be required for Location 1 and a span of 19 feet would be required for Locations 2 and 3. This would involve an extensive amount of disturbance to ramps and roadway pavement and embankments and is not considered to be a feasible alternative due to cost and traffic impacts. Although this alternative would result in an improvement to the stream crossing, it is not a financially viable option.

3. The type and classification of the wetlands involved.

The wetland resources that will be impacted include an unnamed tributary to Jewett Brook and an unnamed tributary to Black Brook and their adjacent wetlands, which are classified as:

Location 1 - R2UB1, R4SB3, and PEM1B

Location 2 - R2UB1 and PEM1B

Location 3 - R2UB1, Bank, PEM1E, and PEM2B

4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.

Impacts include the banks and channel of an unnamed perennial tributary to Jewett Brook and channels of unnamed intermittent and perennial tributaries to Black Brook and their adjacent wetland areas.

The Location 1 culvert outlet is approximately 800' upstream of Black Brook. The northeast limit of work at Location 1 is about 500' southwest of Lily Pond, which is a Prime Wetland.

The Location 3 culvert outlet is about 1,200' upstream of Jewett Brook. Location 2 is about 115' upstream of the Location 3 culvert inlet. The unnamed stream extends nearly a mile upstream of the Location 2 culvert inlet, along the northwest side of NH Route 11A. There is another 84" culvert approximately 70' downstream of the Location 3 outlet.

The adjacent wetlands are all small isolated areas connected to or near their adjacent stream channels.

5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.

The wetlands and streams within the project area are typical of the region and are not considered to be rare.

6. The surface area of the wetlands that will be impacted.

No permanent wetland impacts are proposed for this project. A detailed breakdown of the temporary impacts includes:

- **Temporary wetland impact = 2,979 SF**
- **Temporary perennial stream impact = 2,081 SF / 186 LF**
- **Temporary intermittent stream impact = 143 SF / 20 LF**
- **Temporary bank impact = 366 SF / 56 LF**

Temporary impacts are proposed for resetting existing stone at culvert inlets and outlet, construction access, staging, and water diversion. As per discussion at the November 21, 2018 NHDOT Natural Resource Agency Coordination meeting, work within the existing pipes has not been included as channel impacts.

7. The impact on plants, fish and wildlife including, but not limited to:
   a. Rare, special concern species;
   b. State and federally listed threatened and endangered species;
   c. Species at the extremities of their ranges;
   d. Migratory fish and wildlife;
   e. Exemplary natural communities identified by the DRED-NHB; and
   f. Vernal pools.

a. According to information received from the NH Natural Heritage Bureau, the project is not anticipated to result in impacts to rare or special concern species.

b. Federally-listed species noted in the IPaC report included northern long-eared bat (NLEB) and small whorled pogonia. The project was reviewed under the revised February 5, 2018 FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) and was determined to "may affect and is likely to adversely affect" NLEB. A consistency letter for the project was received on November 20, 2018 (enclosed). Concurrence from USFWS is pending. A review of small whorled pogonia records indicated that there are no known records in Gilford, so no impacts to this species are anticipated. A "No Species Present" letter for small whorled pogonia is included with this application.

Information received from the NH Natural Heritage Bureau indicated that no impacts to state-listed species are anticipated.

c. There are no known species at the extremities of their range within the vicnity of the project.

d. The project is not expected to impact migratory fish and wildlife. Jewett and Black brooks are not identified as Essential Fish Habitat for Atlantic salmon.

e. According to information received from the NH Natural Heritage Bureau, the project is not anticipated to result in impacts to exemplary natural communities.

f. There are no vernal pools within the project area.

8. The impact of the proposed project on public commerce, navigation and recreation.

The project will not impact public commerce, navigation, or recreation. The streams within the project area are not large enough to be used for public commerce or navigation. No road closures are anticipated to be required during construction.

The project area is not used for recreation since it is located along ramps and embankments for the US Route 3/NH Route 11A interchange and the US 3 Bypass northern terminous. Areas impacted by the project are all within the existing ROW. Best Management Practices (BMPs) will be used during construction to minimize any downstream water quality impacts that could affect recreational use along Jewett and Black Brook.

9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.

The proposed culvert rehabilitation will not interfere with the aesthetic interests of the general public. Post construction conditions will be similar to existing conditions and no adverse visual impacts are anticipated.

Some vegetation clearing (approximately 7,500 SF project total) will be required for construction access and staging at culvert inlets and outlets. This will result in temporary visual impact. Areas impacted by the construction access routes will be restored once construction is completed and vegetation will be allowed to re-establish naturally.

10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.

The project will not interfere with or obstruct public rights of passage or access. No permanent changes to the US Route 3/NH Route 11A interchange or the Northern Terminous to the US 3 Bypass are proposed and the project will not change traffic patterns. No road closures are anticipated to be required during construction. The project will not result in any changes to the culverts that would impact access along the stream.

11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.

The project will not have any effect on abutters. The proposed work will not change off-site flow conditions or water levels. Temporary impacts are all within the existing ROW.

12. The benefit of a project to the health, safety, and well being of the general public.

The project will improve safety by repairing three deteriorating culverts on a public road. The existing culverts currently have severe corrosion along the inverts and substantial portions of missing invert. Rehabiliting the culverts will keep the existing culverts functioning as designed with minimal disturbance to the traveling public and prevent the potential collapse of the culverts.

13. The impact of a proposed project on quantity or quality of surface and ground water. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.

The project will not result in any changes in impervious surface or flood storage capacity, so no changes in the quantity or quality of stormwater runoff are anticipated. There are no permanent wetland impacts proposed for this project. No drainage changes are proposed, with the exception of raising the three culvert inverts by 4" and replacing three 12" corrugated metal slope drains with 12" corrugated plastic slope drains. These changes will not have any impact on surface or groundwater within the project area.

Temporary impacts to water quality during construction will be minimized through the use of erosion and sedimentation controls.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

No flooding impacts are anticipated. The rehabilitated culverts will have capacity and headwater depths similar to or slightly better than existing conditions. Outlet velocity increases will be less than 1 ft/s and no downstream impacts are expected since the channels are currently armored with stone. No change to sediment transport capacity is anticipated.

15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.

N/A - The streams within the project area are relatively small and the project is not expected to alter current or wave energy.

16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.

Since the project involves only the rehabilitation of three existing culverts and replacement of three slope drains, temporary wetland and stream impacts are limited to small areas on each end of the culverts, as well areas for construction access. Cummulative impacts that would result from abutting property owner actions would likely not be substantial if the abutters' impacts were also limited to small temporary impacts for the rehabilitation or replacement of existing structures.

17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.

Since the project involves only the rehabilitation of three existing culverts and replacement of three slope drains, no substantial impacts to the values and functions of the stream and wetland complexes are anticipated. No permanent impacts are proposed for this project. Temporary impacts associated with construction access, staging, and water diversion will be restored once construction is complete.

The proposed culvert rehabilitation treatments will not signficantly alter stream flow or water levels within the stream channels or adjacent wetlands. The wetland complexes at each Location will continue to provide functions and values at levels similar to pre-construction conditions.

Temporary disturbance to wildlife and aquatic habitat may occur during construction as a result of clearing vegetation, diverting the stream, and operating construction equipment.

No changes in the wetland complexes' ability to provide sediment retention and stabilization are anticipated, except for the removal of vegetation for construction access and staging. No significant disturbance to wetland plant root systems is anticipated. Wetland vegetation will be allowed to re-establish naturally.

18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.

N/A - No such sites are located near the project.

19. The impact upon the value of areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

N/A - No such areas are located near the project.

20. The degree to which a project redirects water from one watershed to another.

The project will not make any changes that would redirect water from one watershed to another.

Additional comments

Gilford 42249, X-A004(796)

Natural Resource Agency Coordination Meeting Minutes

November 21, 2018

Meli Dube, NHDOT Bureau of Environment, introduced the proposed project which involves rehabilitation of three corrugated metal culverts carrying perennial streams in the Town of Gilford. These culverts are associated with the US Route 3 bypass and will be advertised concurrently with NHDOT project Gilford 41655 which involves rehabilitation of a culvert discussed at the August 2018 Natural Resource Agency Meeting. Chris Carucci, NHDOT Bureau of Highway Design, provided details about each culvert location:

1. Location 1 is 72" diameter x 190' long, crossing under US 3 Bypass 250' south of the bridge over NH 11. Classified as Tier 2, based on drainage area of 524 ac. StreamStats base map (stream network) was not accurate at this location, but overall boundary was reasonable. Lidar and field review showed an increase of 25 ac over StreamStats (a 5% increase). The existing pipe is set at a 0.5% slope and is covered by 24' of roadway fill.
2. Location 2 is 84" diameter x 206' long, crossing diagonally under NH 11A 200' east of the Bypass bridge. Classified as Tier 3, based on drainage area of 829 ac. StreamStats boundary was not accurate at this location due to a 48" pipe adding 125 ac into the watershed (StreamStats area was 704 ac). The existing pipe is set at a 0.9% slope and is covered by 12' of roadway fill.
3. Location 3 is 84" diameter x 220' long, crossing under the Bypass 150' south of the Bypass bridge over NH 11A. Classified as Tier 3, based on drainage area of 835 ac (6 ac larger than Location 2). The existing pipe is set at a 1.6% slope and is covered by 31' of roadway fill.

The existing culverts were constructed in 1964/1965 and have severely deteriorated inverts. All have mitered ends and existing stone protection at the inlets and outlets. The proposed rehabilitation strategy for all three pipes is installation of shotcrete invert lining. Replacement was not considered due to the large amount of fill over the pipes and the significant increase in impacts and cost associated withexcavation and reconstruction of roadways. Shotcrete invert lining meets the needs of the project because the deterioration of the pipes is limited to the invert area and is the most cost effective and low-impact solution to stabilize the existing pipes.

Shotcrete repair involves:

1. Water diversion, in this case through a temporary pipe hung inside the culvert
2. Pressure grouting to fill voids outside the pipe and stop groundwater infiltration
3. Placing reinforcing steel over areas of missing invert to restore structural capacity.
4. Placing concrete through a pump and hose, about 4" thick, extending to about 6" above the rust line.
5. Re-grading stone to meet the new elevation of the invert

The proposed concrete invert will not significantly affect capacity. All 3 culverts operate in outlet control due to the flat slopes and high roughness of the structural plate. Smoother concrete on the lower 1/3 of pipes will offset reduction in area from the 4" concrete lining.

Incidental work includes resetting existing stone fill at the inlet and outlet of each culvert and replacement of three failed slope drains in close proximity to the Location 2 and 3 access roads.

Impacts will not be calculated inside the existing pipes as these areas are previously disturbed and per guidance received at the August Natural Resource Agency Meeting for the Gilford 41655 project. All proposed wetland/stream impacts are temporary for access, water diversion and resetting stone at the inlets and outlets of the existing pipes.

Temporary impacts will be just under 3,000 sf in wetlands, about 2,200 sf of channel and 350 sf banks for a total of about 5,500 sf. Approximate impacts at each location:

Loc 1 Inlet	1250 sf wetland	1,100 sf channel	(65 LF)	
Loc 1 Outlet	860 sf wetland	240 sf channel	(25 LF)	
Loc 2 Inlet	110 sf wetland	360 sf channel	(30 LF)	
Loc 2 Outlet	0 sf wetland	200 sf channel	(20 LF)	
Loc 3 Inlet	200 sf wetland	210 sf channel	(20 LF)	
Loc 3 Outlet	520 sf wetland	110 sf channel	(20 LF)	350 sf Bank

Total Temp Channel 180 LF Total Temp Bank 56 LF Total Temp 236 LF

Carol Henderson, NH Fish and Game, inquired about timing of the work and indicated that spring work would be a concern for fish spawning. C. Carucci confirmed that the work would likely occur during summer during low flow conditions. C. Henderson asked if the Shotcrete installation would create a perch and M. Dube confirmed that the stone at the inlet and outlets will be re-graded to raise the elevation of the stream bed at the inlets and outlets slightly to match the 4" increase in pipe invert elevation. Dale Keirstead, NHDES Wetlands Bureau, noted that Lily Pond is a protected Prime Wetland located north of Location 1. M. Dube stated that the Department is aware of the proximity but that the proposed work will not impact Lily Pond. L. Sommer stated that since the work is minor and will be limited to previously disturbed areas, no mitigation is required for the project as proposed.

CULVERT REHABILITATION

SOUTHBOUND OFF RAMP AT NH ROUTE 11A/US ROUTE 3 INTERCHANGE

&

NORTHBOUND US ROUTE 3 BYPASS TERMINUS

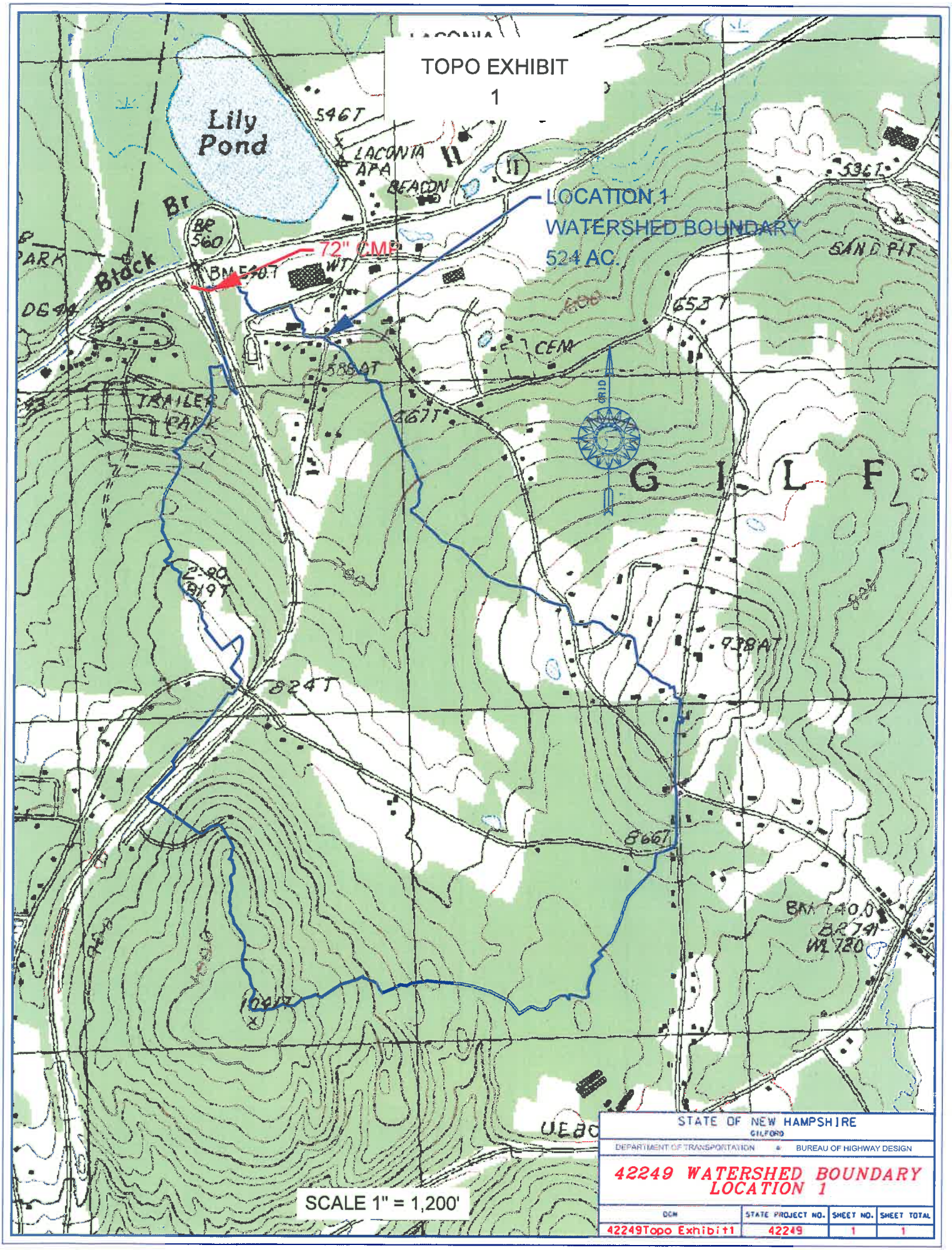
GILFORD, NH

NHDOT PROJECT NO. 42249

MITIGATION

There are no Permanent impacts proposed. Temporary wetland impacts will be 5,569 sf, including 206 LF of impact to channels and 56 LF of impacts to banks.

Project mitigation was discussed with NHDES at the November 21, 2018 Natural Resource Agency Coordination Meeting and no mitigation will be required. This project will follow the current BMP standards to protect the existing streams from any infiltration of silt and sands from the construction process. All related construction activities that disturb the existing streams will be done during low flow periods.


TOPO EXHIBIT
1
Lily Pond
LACONIA
APA
BEACON
546T
LOCATION 1
WATERSHED BOUNDARY
524 AC.
72" CMP
BM 540.7
WT
BR 560
Br
Black
SAND PIT
653T
CEM
538AT
TRAILER PARK
467T
GRID
G I L F
2-80
919T
928AT
824T
866T
BM 740.0
BR 741
WL 720
689T
UEAC
SCALE 1" = 1,200'
STATE OF NEW HAMPSHIRE
GILFORD
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DESIGN
42249 WATERSHED BOUNDARY
LOCATION 1
DGN
STATE PROJECT NO.
SHEET NO.
SHEET TOTAL
42249Topo Exhibit1
42249
1
1

NH Department of Transportation
Bureau of Highway Design
Project 42249

Location 1, Existing 72" cmp
Watershed Area 524 acres, Tier 2

Env-Wt 904.06 Repair or Rehabilitation of Tier 1 or Tier 2 Existing Legal Crossings

- In order to qualify under this section, the crossing cannot have a history of causing or contributing to flooding that damages the crossing or other infrastructure. Does the crossing have a history of flooding? No

- Repair or rehabilitation pursuant to this section may be accomplished by concrete repair, slip lining, cured-in-place lining, or concrete invert lining. Please describe how this applies to the subject project.
  This culvert will be rehabilitated by concrete invert lining.

  See the Supplemental Narrative for detailed hydraulic analysis.

If the above criteria do not apply to this project, the crossing does not qualify under this section and must be designed according to 904.02 (Tier 1 crossings) or 904.05 (Tier 2 crossings).

If the above criteria apply to this project, please provide the following information.

The project may qualify as a **minimum** impact project if:
The crossing does not diminish the hydraulic capacity of the crossing.
The proposed rehabilitation will not significantly affect capacity.

The crossing does not diminish the capacity of the crossing to accommodate aquatic life passage.
Existing stone will be reset to match the new invert elevations at the culvert inlet and outlet, maintaining the capacity to accommodate the passage of aquatic life.

The crossing meets the general design criteria specified in Env-Wt 904.01, as follows:

Env-Wt 904.01
(a) Not be a barrier to sediment transport;
The proposed rehabilitation will not reduce the culvert's ability to transport sediment.

(b) Prevent the restriction of high flows and maintain existing low flows;
The proposed rehabilitation will not significantly change high flow or low flow conditions.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;
The proposed rehabilitation will not obstruct or otherwise disrupt the movement of aquatic life beyond the actual duration of construction.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;
The proposed rehabilitation will not have a significant effect on capacity. Headwater elevation and extent of ponding will not be significantly different from the existing condition.

(e) Preserve watercourse connectivity where it currently exists;
The proposed rehabilitation allows for the watercourse connectivity to remain as it is today.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;
The proposed rehabilitation will maintain the current connectivity.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and
Velocity increase due to the smoother concrete invert will be less than 1 ft/s. Existing stone armor is sufficient to prevent erosion.

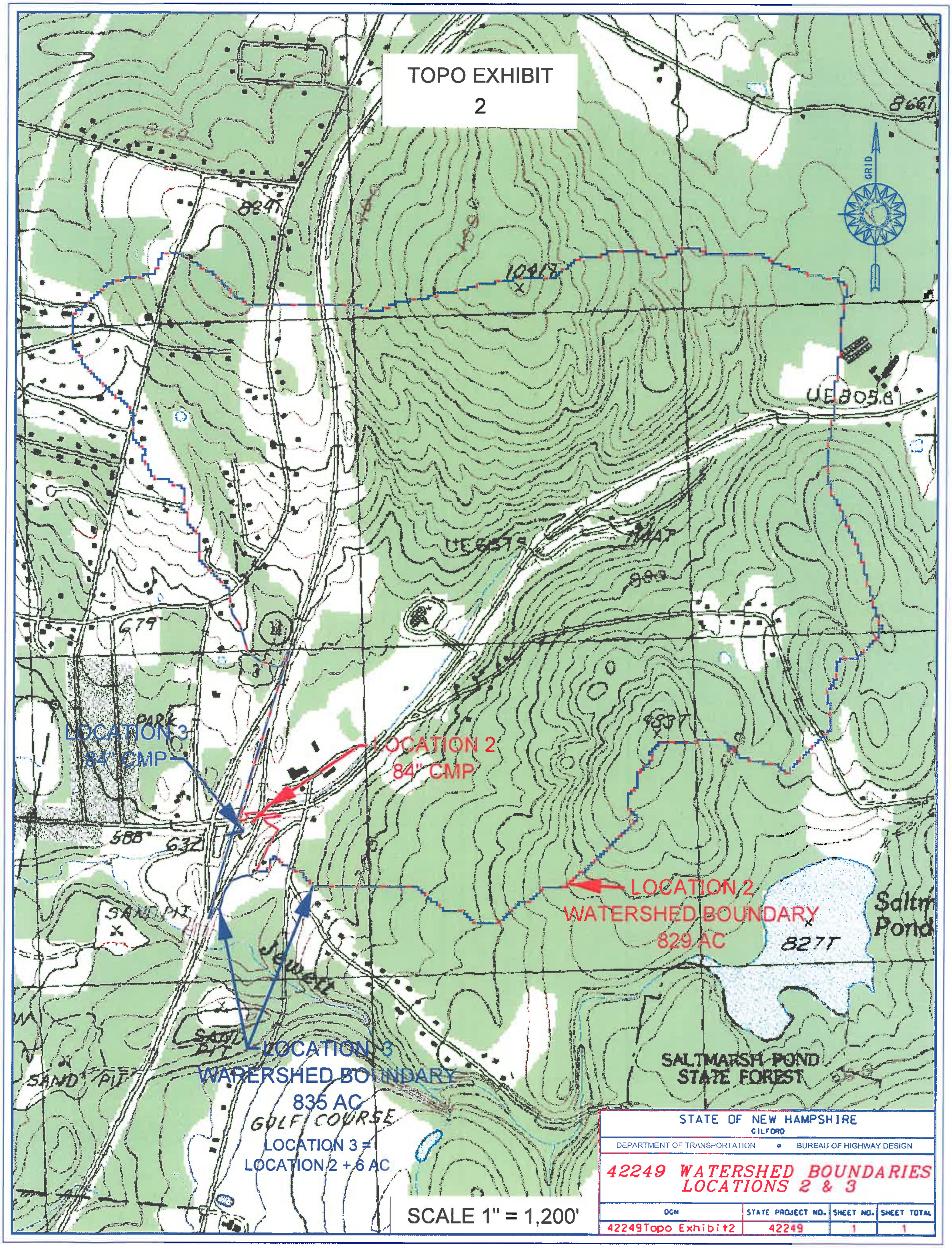
(h) Not cause water quality degradation.
The proposed rehabilitation will not have a permanent effect on water quality. Erosion control best management practices will be used to prevent degradation to water quality during construction.

If the project does not qualify as a minimum impact project due to reasons stated above, it may qualify as a **minor** impact project if:

The crossing does not adversely impact the stability of the stream banks or stream bed upstream or downstream of the crossing.
The existing stream channels are stable and heavily armored with stone. Velocity increase due to the smoother concrete invert will be less than 1 ft/s. Existing stone armor is sufficient to prevent erosion.

The crossing does not cause an increase in the frequency of flooding or overtopping of banks.
The proposed rehabilitation will not have a significant effect on capacity. Headwater elevation and extent of ponding will not be significantly different from the existing condition.

If the project does not meet the above criteria for minimum OR minor, the crossing does not qualify under this section and must be designed according to 904.02 (Tier 1 crossings) or 904.05 (Tier 2 crossings).


TOPO EXHIBIT
2
GRID
LOCATION 3
84" CMP
LOCATION 2
84" CMP
LOCATION 2
WATERSHED BOUNDARY
829 AC
LOCATION 3
WATERSHED BOUNDARY
835 AC
LOCATION 3 =
LOCATION 2 + 6 AC
GOLF COURSE
SAND PIT
Jewett
SALTMARSH POND
STATE FOREST
827T
SCALE 1" = 1,200'
STATE OF NEW HAMPSHIRE
GILFORD
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DESIGN
42249 WATERSHED BOUNDARIES
LOCATIONS 2 & 3
DGN
42249Topo Exhibit2
STATE PROJECT NO.
42249
SHEET NO.
1
SHEET TOTAL
1

NH Department of Transportation
Bureau of Highway Design
Gilford, 42249
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT

Location 2, Existing 84" cmp
Watershed Area 829 acres, Tier 3

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.69 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.)*

See the Supplemental Narrative for detailed hydraulic analysis.

The NH Regional Geometry Curves predict a bankfull width of approximately 14 feet for a drainage area of 1.3 square miles. In order to meet the requirements for a Tier 3 crossing, a replacement structure with a span of around 19 feet would be necessary. A structure of this size is not practicable due to the height of the fill and character of roadway above the existing pipe. The costs and impacts for excavation, maintenance of traffic and utility services, reconstruction of roadways, and additional wetland impacts for staging and access would be significantly larger than those required for the proposed rehabilitation. Project cost for a compliant structure would be on the order of $1,000,000. The existing crossing has the capacity to pass the Q100, has no history of flooding, and the preliminary cost for the proposed design is about $205,000.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

It is not practicable to design and construct alternatives other than the proposed rehabilitation. Replacement with a smaller embedded box culvert would have costs and impacts similar to those for a fully compliant structure. Since the existing capacity is adequate and the proposed rehabilitation will not significantly alter performance, the additional costs and impacts associated with replacement cannot be justified.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

It is not practicable to alter water depths or velocities within the existing culvert without adversely affecting hydraulic capacity.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

It is not practicable to provide vegetated banks within the existing culvert without adversely affecting hydraulic capacity.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

It is not practicable to alter the existing culvert alignment or grade as part of the proposed rehabilitation treatment.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

The rehabilitated culvert will accommodate the 100-year flood event. The existing culvert has the capacity to pass approximately 400 cfs vs the design Q100 of 328 cfs. Lining the culvert will decrease the opening area slightly, but this will be offset by the smoother concrete invert, resulting in a slight improvement in capacity.

The smoother concrete invert will result in a slight increase in outlet velocity, however no downstream impacts are anticipated since the channel is currently armored with stone and erosion is not anticipated to be a concern. The anticipated increase for the 100-year storm outlet velocity is less than 1 foot/second.

(f) To simulate a natural stream channel.

It is not practicable to simulate a natural stream channel within the existing culvert without adversely affecting hydraulic capacity.

(g) So as not to alter sediment transport competence.

The proposed rehabilitation is not expected to alter sediment transport competence since proposed flow conditions will be similar to existing conditions.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01
(a) Not be a barrier to sediment transport;

The existing culvert is not a barrier to sediment transport and the proposed rehabilitation will not significantly alter sediment transport.

(b) Prevent the restriction of high flows and maintain existing low flows;

The rehabilitated culvert will continue to convey the 100-year storm event and will not restrict high flows. Low flows will be maintained since the stream channel will be graded to match the new inverts at the inlet and outlet

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

The existing culvert is level with the stream channel (not "perched") and the rehabilitated culvert is proposed to maintain this condition.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

The proposed rehabilitation will not increase the frequency of flooding or overtopping of banks. Lining the culvert will decrease the opening area slightly, but this will be offset by the smoother concrete invert, resulting in a slight improvement in capacity.

(e) Preserve watercourse connectivity where it currently exists;

The existing watercourse connectivity within the project area will be maintained.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

N/A

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

The smoother concrete invert will result in a slight increase in outlet velocity, however no downstream impacts are anticipated since the channel is currently armored with stone and erosion is not anticipated to be a concern. The anticipated increase for the 100-year storm outlet velocity is less than 1 foot/second.

(h) Not cause water quality degradation.

The project will not increase runoff or change drainage patterns. No new impervious surface is proposed. No water quality impacts from the culvert lining work are anticipated beyond potential temporary impacts during construction. Erosion and sediment controls will be used to minimize these temporary impacts.

NH Department of Transportation
Bureau of Highway Design
Gilford, 42249
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT

Location 3, Existing 84" cmp
Watershed Area 835 acres, Tier 3

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.69 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.)*

See the Supplemental Narrative for detailed hydraulic analysis.

The NH Regional Geometry Curves predict a bankfull width of approximately 14 feet for a drainage area of 1.3 square miles. In order to meet the requirements for a Tier 3 crossing, a replacement structure with a span of around 19 feet would be necessary. A structure of this size is not practicable due to the height of the fill and character of roadway above the existing pipe. The costs and impacts for excavation, maintenance of traffic and utility services, reconstruction of roadways, and additional wetland impacts for staging and access would be significantly larger than those required for the proposed rehabilitation. Project cost for a compliant structure would be on the order of $1,000,000. The existing crossing has the capacity to pass the Q100, has no history of flooding, and the preliminary cost for the proposed design is about $215,000.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

It is not practicable to design and construct alternatives other than the proposed rehabilitation. Replacement with a smaller embedded box culvert would have costs and impacts similar to those for a fully compliant structure. Since the existing capacity is adequate and the proposed rehabilitation will not significantly alter performance, the additional costs and impacts associated with replacement cannot be justified.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

It is not practicable to alter water depths or velocities within the existing culvert without adversely affecting hydraulic capacity.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

It is not practicable to provide vegetated banks within the existing culvert without adversely affecting hydraulic capacity.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

It is not practicable to alter the existing culvert alignment or grade as part of the proposed rehabilitation treatment.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

The rehabilitated culvert will accommodate the 100-year flood event. The existing culvert has the capacity to pass approximately 470 cfs vs the design Q100 of 328 cfs. Lining the culvert will decrease the opening area slightly, but this will be offset by the smoother concrete invert, resulting in a slight improvement in capacity.

The smoother concrete invert will result in a slight increase in outlet velocity, however no downstream impacts are anticipated since the channel is currently armored with stone and erosion is not anticipated to be a concern. The anticipated increase for the 100-year storm outlet velocity is less than 1 foot/second.

(f) To simulate a natural stream channel.

It is not practicable to simulate a natural stream channel within the existing culvert without adversely affecting hydraulic capacity.

(g) So as not to alter sediment transport competence.

The proposed rehabilitation is not expected to alter sediment transport competence since proposed flow conditions will be similar to existing conditions.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01
(a) Not be a barrier to sediment transport;

The existing culvert is not a barrier to sediment transport and the proposed rehabilitation will not significantly alter sediment transport.

(b) Prevent the restriction of high flows and maintain existing low flows;

The rehabilitated culvert will continue to convey the 100-year storm event and will not restrict high flows. Low flows will be maintained since the stream channel will be graded to match the new inverts at the inlet and outlet

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

The existing culvert is level with the stream channel (not "perched") and the rehabilitated culvert is proposed to maintain this condition.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

The proposed rehabilitation will not increase the frequency of flooding or overtopping of banks. Lining the culvert will decrease the opening area slightly, but this will be offset by the smoother concrete invert, resulting in a slight improvement in capacity.

(e) Preserve watercourse connectivity where it currently exists;

The existing watercourse connectivity within the project area will be maintained.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

N/A

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

The smoother concrete invert will result in a slight increase in outlet velocity, however no downstream impacts are anticipated since the channel is currently armored with stone and erosion is not anticipated to be a concern. The anticipated increase for the 100-year storm outlet velocity is less than 1 foot/second.

(h) Not cause water quality degradation.

The project will not increase runoff or change drainage patterns. No new impervious surface is proposed. No water quality impacts from the culvert lining work are anticipated beyond potential temporary impacts during construction. Erosion and sediment controls will be used to minimize these temporary impacts.

NEW HAMPSHIRE NATURAL HERITAGE BUREAU
NHB DATACHECK RESULTS LETTER

To: Melilotus Dube, New Hampshire Department of Transportation
7 Hazen Drive

Concord, NH 03301

From: NH Natural Heritage Bureau

Date: 9/11/2018 (valid for one year from this date)

Re: Review by NH Natural Heritage Bureau of request submitted 9/5/2018

NHB File ID: NHB18-2771 **Applicant:** Melilotus Dube

Location: Gilford
US Route 3 x NH Route 11A and US Route 3 x NH Route 11

Project Description: NHDOT Gilford 42249. The proposed project will repair, rehabilitate or replace three deteriorated corrugated metal pipes under US Route 3 in the Town of Gilford. The first location is a 84" CMP which carries an unnamed stream under US Route 3 just south of the US Route 11A overpass. The second location is an 84" CMP which carries the same unnamed stream under the intersection of the US Route 3 Northbound Off-Ramp and NH Route 11A. The third location is a 74" CMP which carries an unnamed stream under US Route 3 just south of the northern terminus at the interchange with NH Route 11.

The NH Natural Heritage database has been checked by staff of the NH Natural Heritage Bureau and/or the NH Nongame and Endangered Species Program for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government.

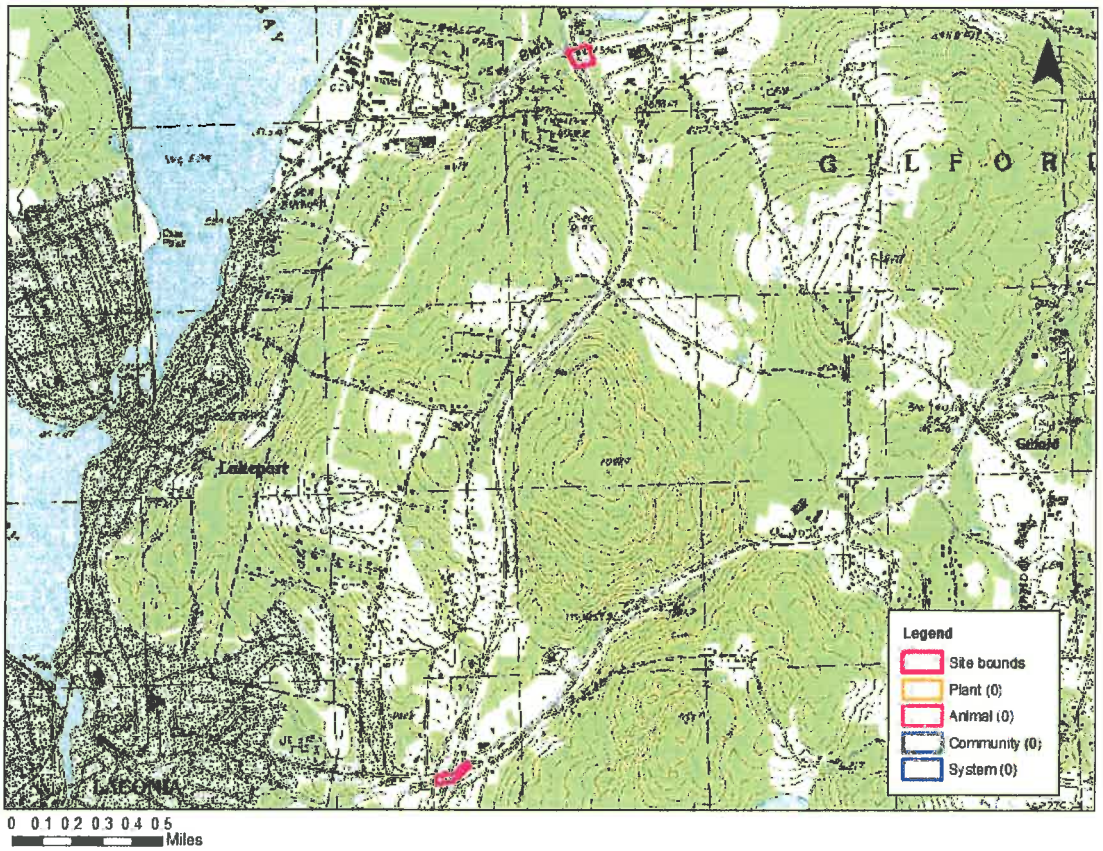
It was determined that, although there was a NHB record (e.g., rare wildlife, plant, and/or natural community) present in the vicinity, we do not expect that it will be impacted by the proposed project. This determination was made based on the project information submitted via the NHB Datacheck Tool on 9/5/2018, and cannot be used for any other project.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

MAP OF PROJECT BOUNDARIES FOR: **NHB18-2771**

NHB18-2771



Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2018-SLI-2964
Event Code: 05E1NE00-2018-E-07000
Project Name: Gilford 42249

September 05, 2018

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2964

Event Code: 05E1NE00-2018-E-07000

Project Name: Gilford 42249

Project Type: TRANSPORTATION

Project Description: The proposed project will rehabilitate or replace three deteriorated corrugated metal pipes under US Route 3 in the Town of Gilford. The first location is a 84" CMP which carries an unnamed stream under US Route 3 just before it crosses NH Route 11A. The second location is a 84" CMP which carries the same unnamed stream under the intersection of the US Route 3 Northbound Off-Ramp and NH Route 11A. The third location is a 72" CMP which carries an unnamed stream under US Route 3 just before the northern terminus at the intersection of NH Route 11.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/43.56592184725707N71.43370830351748W

Counties: Belknap, NH

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Flowering Plants

NAME	STATUS
Small Whorled Pogonia *Isotria medeoloides* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

RE: small whorled pogonia

January 8, 2018

To Whom It May Concern:

This project was reviewed for the presence of federally listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

http://www.fws.gov/newengland/EndangeredSpec-Consultation.htm (accessed January 2018)

Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact David Simmons of this office at 603-227-6425 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

IPaC Record Locator: 420-14678821 November 20, 2018

Subject: Consistency letter for the 'Gilford 42249' project (TAILS 05E1NE00-2018-R-2964) under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated to verify that the **Gilford 42249** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, and is likely to adversely affect the endangered Indiana bat (*Myotis sodalis*) and/or the threatened Northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required.

This "may affect - likely to adversely affect" determination becomes effective when the lead Federal action agency or designated non-federal representative uses it to ask the Service to rely on the PBO to satisfy the agency's consultation requirements for this project. Please provide this consistency letter to the lead Federal action agency or its designated non-federal representative with a request for its review, and as the agency deems appropriate, transmittal to this Service Office for verification that the project is consistent with the PBO.

This Service Office will respond by letter to the requesting Federal action agency or designated non-federal representative within 30 calendar days to:

- verify that the Proposed Action is consistent with the scope of actions covered under the PBO;

- verify that all applicable avoidance, minimization, and compensation measures are included in the action proposal;
- identify any action-specific monitoring and reporting requirements, consistent with the monitoring and reporting requirements of the PBO, and
- identify anticipated incidental take.

ESA Section 7 compliance for this Proposed Action is not complete until the Federal action agency or its designated non-federal representative receives a verification letter from the Service.

For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities: If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency for the Proposed Action accordingly.

The following species may occur in your project area and **are not** covered by this determination:

- Small Whorled Pogonia, *Isotria medeoloides* (Threatened)

Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

Name

Gilford 42249

Description

The proposed project will rehabilitate or replace three deteriorated corrugated metal pipes under US Route 3 in the Town of Gilford. The first location is a 84" CMP which carries an unnamed stream under US Route 3 just before it crosses NH Route 11A. The second location is a 84" CMP which carries the same unnamed stream under the intersection of the US Route 3 Northbound Off-Ramp and NH Route 11A. The third location is a 72" CMP which carries an unnamed stream under US Route 3 just before the northern terminus at the intersection of NH Route 11.

Avoidance And Minimization Measures (AMMs)

These measures **were accepted** as part of this determination key result:

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

LIGHTING AMM 1

Direct temporary lighting away from suitable habitat during the active season.

TREE REMOVAL AMM 1

Modify all phases/aspects of the project (e.g., temporary work areas, alignments) to avoid tree removal.

TREE REMOVAL AMM 3

Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on March 16, 2018. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Date Reviewed: (Desktop or Field Review Date)	10/29/2018		
Project Name:	Gilford		
State Number:	42249	**FHWA Number:**	X-A004(796)
Environmental Contact:	Meli Dube	**DOT**	
Email Address:	Melilotus.Dube@dot.nh.gov	**Project Manager:**	Kirk Mudgett

Project Description: The proposed project involves repair, rehabilitation or replacement of three culverts under US Route 3 in the Town of Gilford. The first location is a 84" CMP (installed in 1964) which carries an unnamed stream under US Route 3 just south of the NH Route 11A overpass. The second location is an 84" CMP (installed in 1964) which carries the same unnamed stream under the intersection of the US Route 3 Northbound Off-Ramp and NH Route 11A. The third location is a 74" CMP (installed in 1965) which carries an unnamed stream under US Route 3 just south of the northern terminus at the interchange with NH Route 11.

Please select the applicable activity/activities:

Highway and Roadway Improvements	
☐	1. Modernization and general highway maintenance **that may require additional highway right-of-way or easement**, including: Choose an item. Choose an item.
☐	2. Installation of rumble strips or rumble stripes
☐	3. Installation or replacement of pole-mounted signs
☐	4. Guardrail replacement, provided any extension does not connect to a bridge older than 50 years old (unless it does already), and there is no change in access associated with the extension
Bridge and Culvert Improvements	
☐	5. Culvert replacement (excluding stone box culverts), when the culvert is less than 60" in diameter and excavation for replacement is limited to previously disturbed areas
☐	6. Bridge deck preservation and replacement, as long as no character defining features are impacted
☒	7. Non-historic bridge and culvert maintenance, renovation, or total replacement, **that may require minor additional right-of-way or easement**, including: a. replacement or maintenance of non-historic bridges Choose an item.
☐	8. Historic bridge maintenance activities within the limits of existing right-of-way, including: Choose an item. Choose an item.
☐	9. Stream and/or slope stabilization and restoration activities (including removal of debris or sediment obstructing the natural waterway, or any non-invasive action to restore natural conditions)
Bicycle and Pedestrian Improvements	
☐	10. Construction of pedestrian walkways, sidewalks, sidewalk tip-downs, small passenger shelters, and alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons
☐	11. Installation of bicycle racks
☐	12. Recreational trail construction
☐	13. Recreational trail maintenance when done on existing alignment
☐	14. Construction of bicycle lanes and shared use paths and facilities within the existing right-of-way
Railroad Improvements	

Appendix B Certification – Activities with Minimal Potential to Cause Effects

☐	15. Modernization, maintenance, and safety improvements of railroad facilities within the existing railroad or highway right-of-way, **provided no historic railroad features are impacted,** including, but not limited to: Choose an item. Choose an item.
☐	16. In-kind replacement of modern railroad features (i.e. those features that are less than 50 years old)
☐	17. Modernization/modification of railroad/roadway crossings provided that all work is undertaken within the limits of the roadway structure (edge of roadway fill to edge of roadway fill) and no associated character defining features are impacted
Other Improvements	
☐	18. Installation of Intelligent Transportation Systems
☐	19. Acquisition or renewal of scenic, conservation, habitat, or other land preservation easements where no construction will occur
☐	20. Rehabilitation or replacement of existing storm drains.
☐	21. Maintenance of stormwater treatment features and related infrastructure

Please describe how this project is applicable under Appendix B of the Programmatic Agreement.

The proposed project meets the intent of Appendix B of the Section 106 Programmatic Agreement because all work is for the purpose of maintaining or replacing an existing structurally deficient structure in-kind. There are no recorded archaeological sites in the project locations, and the nearest known sites lie over 1.25 mile distant. Proposed activities appear to be confined to previously disturbed locations.

Please submit this Certification Form along with the Transportation RPR, including photographs, USGS maps, design plans and as-built plans, if available, for review. Note: The RPR can be waived for in-house projects, please consult Cultural Resources Program Staff.

Coordination Efforts:

Has an RPR been submitted to NHDOT for this project?	No	NHDHR R&C # assigned?	No
Please identify public outreach effort contacts; method of outreach and date:	Initial Contact Letters were sent to all Town Officials, including the Historic District Commission on October 24, 2018. No responses have been received to date.		

Finding: (To be filled out by NHDOT Cultural Resources Staff)

☒	**No Potential to Cause Effects**	☐	**No Historic Properties Affected**
This finding serves as the Section 106 Memorandum of Effect. No further coordination is necessary.			
☐	**This project does *not* comply with Appendix B. Review will continue under Stipulation VII of the Programmatic Agreement. Please contact NHDOT Cultural Resources Staff to determine next steps.**		

NHDOT comments: All three culverts fall within the Program Comment for post-1945 bridges and culverts, exempting them from Section 106 review.

Olivia Chaves

NHDOT Cultural Resources Staff

10/29/2018

Date

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Coordination of the Section 106 process should begin as early as possible in the planning phase of the project (undertaking) so as not to cause a delay.

Project sponsors should not predetermine a Section 106 finding under the assumption a project is limited to the activities listed in Appendix B until this form is signed by the NHDOT Bureau of Environment Cultural Resources Program staff.

Every project shall be coordinated with, and reviewed by the NHDOT-BOE Cultural Resources Program in accordance with the *Programmatic Agreement Among the Federal Highway Administration, the New Hampshire State Historic Preservation Office, the Army Corps of Engineers, New England District, the Advisory Council on Historic Preservation, and the New Hampshire Department of Transportation Regarding the Federal Aid Highway Program in New Hampshire*. In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

If any portion of the project is not entirely limited to any one or a combination of the activities specified in Appendix B (with, or without the inclusion of any activities listed in Appendix A), please continue discussions with NHDOT Cultural Resources staff.

This No Potential to Cause Effect or No Historic Properties Affected project determination is your Section 106 finding, as defined in the Programmatic Agreement.

Should project plans change, please inform the NHDOT Cultural Resources staff in accordance with Stipulation VII of the Programmatic Agreement.

US Army Corps of Engineers
New England District

New Hampshire General Permits (GPs)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to "work" include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See GC 5, regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		X
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to SAS, special wetlands. Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) DataCheck Tool for information about resources located on the property at https://www2.des.state.nh.us/nhb_datacheck/. The book Natural Community Systems of New Hampshire also contains specific information about the natural communities found in NH.		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)	X	
2.5 The overall project site is more than 40 acres?		X
2.6 What is the area of the previously filled wetlands?	unknown	
2.7 What is the area of the proposed fill in wetlands?	0 SF	
2.8 What is the % of previously and proposed fill in wetlands to the overall project site?	unknown	
3. Wildlife	Yes	No
3.1 Has the NHB & USFWS determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require an NHB ID number & a USFWS IPAC determination.) NHB DataCheck Tool: https://www2.des.state.nh.us/nhb_datacheck/ USFWS IPAC website: https://ecos.fws.gov/ipac/location/index	X	

3.2 Would work occur in any area identified as either "Highest Ranked Habitat in N.H." or "Highest Ranked Habitat in Ecological Region"? (These areas are colored magenta and green, respectively, on NH Fish and Game's map, "2010 Highest Ranked Wildlife Habitat by Ecological Condition.") Map information can be found at: • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html.		X
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the GC 21?	X	
4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?	X	
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?	N/A	
5. Historic/Archaeological Resources		
For a minimum, minor or major impact project - a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) with your DES file number shall be sent to the NH Division of Historical Resources as required on Page 11 GC 8(d) of the GP document**		X

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.
** If your project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.

Additional Information:

**1.1 The Location 1 culvert outlet is approximately 800' upstream of Black Brook. The Location 3 culvert outlet is approximately 1,200' upstream of Jewett Brook.
Black Brook and Jewett Brook do not have any listed impairments.**

2.1 Unnamed tributaries to Black Brook and Jewett Brook pass through the culverts that are being rehabilitated.

2.4 The project will involve approximately 7,500 SF of vegetation clearing for access and staging during construction. Vegetation is predominantly small trees (less than 3" diameter) and perennial woody shrubs. Root systems will not be disturbed. Areas that are cleared will be allowed to re-establish naturally once construction is complete.

3.1 The NHB report indicated that a record is in the vicinity of the project, but there would be no impacts. The USFWS IPaC report listed northern long-eared bat (NLEB) and small whorled pogonia. There are no small whorled-pogonia records in Gilford, so no impacts from the project are anticipated. The project was reviewed under the revised February 5, 2018 FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) and was determined to "may affect and is likely to adversely affect" NLEB. A consistency letter for the project was received on November 20, 2018. Concurrence from USFWS is pending.

4.1 The subject culverts are located within Zone A (100 year) floodplains. The project will not result in any fill being placed within floodplains so no loss of flood storage is anticipated.

Photos by Gove Environmental Services, Inc. 11/8/2018
and NHDOT Highway Design 9/19/2017, 9/7/2018, 10/26/2018

9/7/2018

Location 1 – Inlet side access from NH 11
Wetland #1, Impact Area A

11/8/2018

Location 1 – Inlet side main channel, looking upstream
Wetland #2, Impact Area B

11/8/2018

Location 1 – Inlet side intermittent stream, looking upstream
Wetland #4, Impact Area B

9/19/2017

Location 1 – 72" Culvert inlet
Wetland #2, Impact Area B

9/19/2017

Location 1 – 72" Culvert outlet
Wetland #6, Impact Area C

9/19/2017

Location 1 – outlet channel
Wetland #6, Impact Area C

11/8/2018

Location 1 – outlet side access, looking north (72" outlet on right)
Wetland #7, Impact Area C

9/19/2017

Location 2 – 84" Culvert Inlet
Wetland #11, Impact Area D

11/8/2018

Location 2 – Inlet channel, looking upstream
Wetland #10 and #11, Impact Area D

9/19/2017

Location 2 – 84" Culvert Outlet
Wetland #12, Impact Area E

9/19/2017

Location 2 – Outlet channel, looking downstream toward Location 3 inlet
Wetland #12, Impact Area E

10/26/2018

Access to Location 2 outlet (left), Location 3 inlet (center)
Wetland #12, Impact Areas E and F

11/8/2018

Location 3 inlet (top left), slope drain outlet (just out of view on right)
Wetland #13, Impact Area F

9/19/2017

Location 3 – 84" Culvert Inlet
Wetland #12, Impact Area F

9/19/2017

Location 3 – Inlet channel, looking upstream
Wetland #12, Impact Area F

9/7/2018

Location 3 – 84" Culvert Outlet, looking downstream
Wetland #B1 and #14, Impact Area G

9/19/2017

Location 3 – outlet channel
Wetland #14, #B1, #B2 Impact Area G

10/26/2018

Access to Location 3 outlet (bottom left) and Project 41655 Culvert inlet (center)
Wetland #15, Impact Area G

Gilford 42249

CONSTRUCTION SEQUENCE

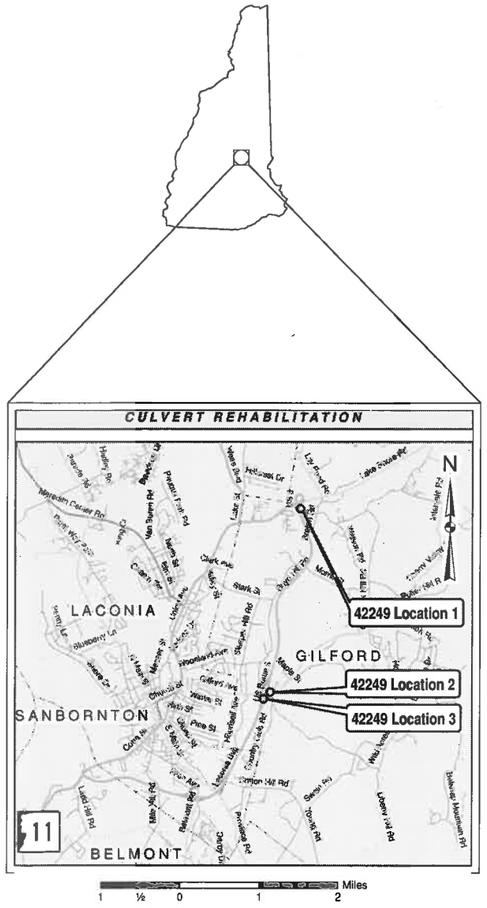
Typical Construction Sequence for each Location
(Some work may occur concurrently at multiple Locations)

1. Install perimeter controls
2. Perform necessary clearing operations for access and staging
3. Place temporary protection such as mats or stone over geotextile where access roads cross wetlands
4. Install water diversion at inlet and other sedimentation controls/BMP's as needed
5. Clean water bypass shall be through a temporary pipe routed through the existing pipe unless otherwise approved as part of the Contractor's SWPPP
6. Clean and inspect existing pipe
7. Fill voids outside of pipe and areas of missing invert with grout
8. Place reinforcement
9. Apply shotcrete invert lining
10. Reset existing stone at inlet and outlet to match new inverts
11. Remove water diversion, re-establish flow through culvert
12. Replace slope drains
13. Remove temporary access roads
14. Stabilize disturbed areas
15. Remove erosion control measures

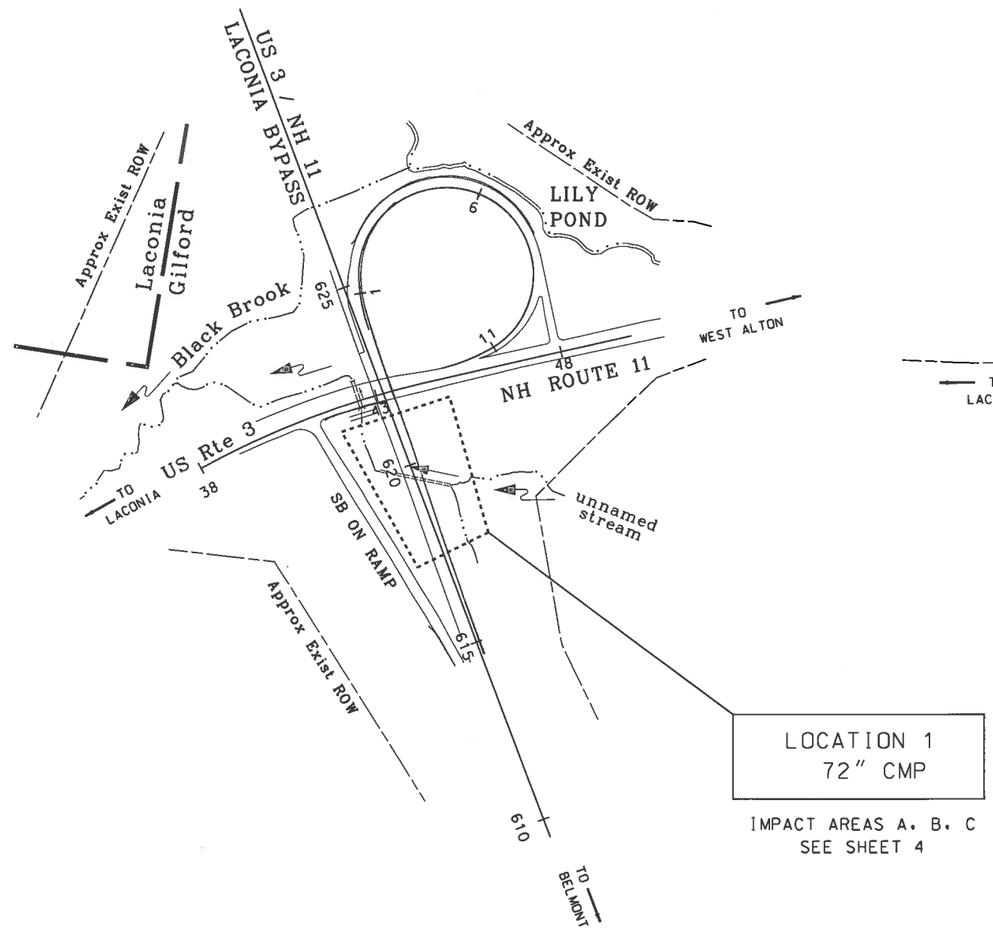
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

WETLANDS PLANS
FEDERAL AID PROJECT

X-A004(796)
N.H. PROJECT NO. 42249

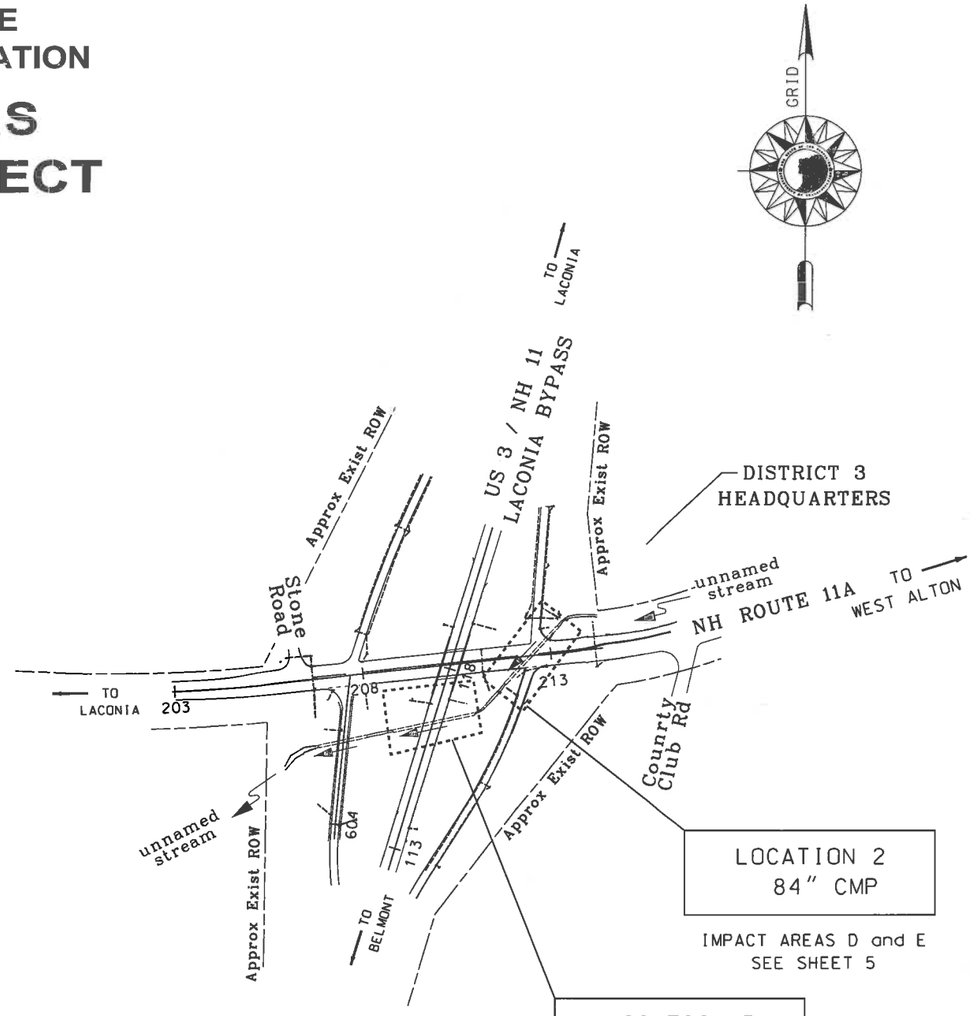


LOCATION MAP



LOCATION 1
72" CMP

IMPACT AREAS A, B, C
SEE SHEET 4



LOCATION 2
84" CMP

IMPACT AREAS D and E
SEE SHEET 5

LOCATION 3
84" CMP

IMPACT AREAS F and G
SEE SHEET 6

INDEX OF SHEETS

DRAWN BY JJN DATE 11/2018
CHECKED BY CAC DATE 12/5/18

DATE: 12-10-18

TOWN OF GILFORD
COUNTY OF BELKNAP
SCALE: 1" = 200'

Wetland Delineation by:
Location 1, 2, and 3 inlet area:
Gove Environmental Services, Inc
by Brendan Quigley on 11/8/2018.
Location 3 outlet area:
NHDOT, Matt Urban & Sarah Large 11/13/2017.

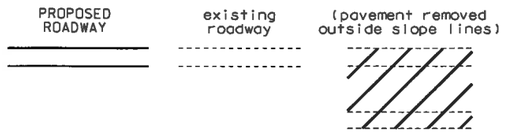
NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

US 3 / NH 11 / NH 11A
CULVERT REHABILITATION
WETLAND IMPACT PLANS

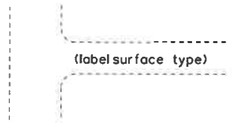
FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A004(796)	42249	1	11

GENERAL

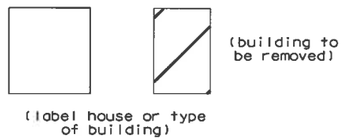
EDGE OF PAVEMENT
TRAVELED WAY



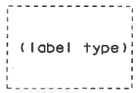
DRIVEWAYS



BUILDINGS

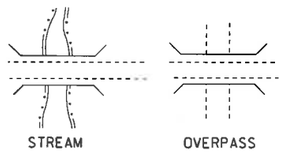


FOUNDATION



LEACH FIELD

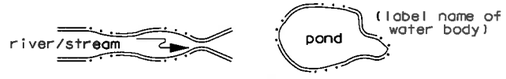
BRIDGE CROSSINGS



STEPS AND WALK

INTERMITTENT WATER COURSE

SHORE LINE



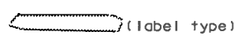
POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS)

TREE OR STUMP (CROSS-SECTIONS)

HEDGE

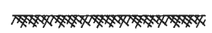


MONITORING WELL

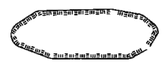
WELL

FLAG POLE

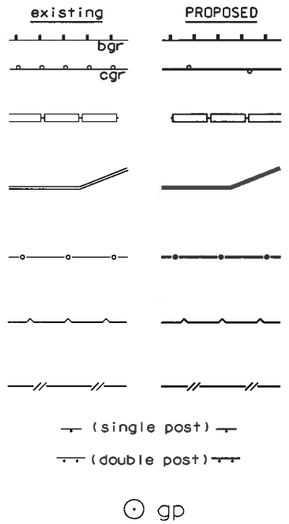
ORIGINAL GROUND (TYPICALS)



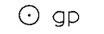
ROCK OUTCROP



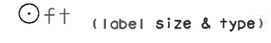
ROCK LINE (TYPICALS & SECTIONS ONLY)



GAS PUMP



FUEL TANK (ABOVE GROUND)



STORAGE TANK FILLER CAP

SEPTIC TANK

GRAVE

MAILBOX

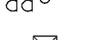
VENT PIPE

SATELLITE DISH ANTENNA

PHONE

GROUND LIGHT/LAMP POST

BORING LOCATION



TEST PIT

INTERSTATE NUMBERED HIGHWAY

UNITED STATES NUMBERED HIGHWAY

STATE NUMBERED HIGHWAY

SHORELAND - WETLAND

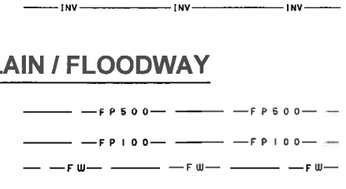
WETLAND DESIGNATION AND TYPE

DELINEATED WETLAND
ORDINARY HIGH WATER
TOP OF BANK
TOP OF BANK & ORDINARY HIGH WATER
NORMAL HIGH WATER
WIDTH AT BANK FULL
PRIME WETLAND
PRIME WETLAND 100' BUFFER
NON-JURISDICTIONAL DRAINAGE AREA
COWARDIN DISTINCTION LINE
TIDAL BUFFER ZONE
DEVELOPED TIDAL BUFFER ZONE
HIGHEST OBSERVABLE TIDE LINE
MEAN HIGH WATER
MEAN LOW WATER
VERNAL POOL
SPECIAL AQUATIC SITE
REFERENCE LINE
WATER FRONT BUFFER
NATURAL WOODLAND BUFFER
PROTECTED SHORELAND
INVASIVE SPECIES LABEL

INVASIVE SPECIES

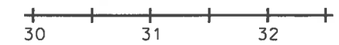
FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY
100 YEAR FLOODPLAIN BOUNDARY
FLOODWAY



ENGINEERING

CONSTRUCTION BASELINE



PC, PT, POT (ON CONST BASELINE)

PI (IN CONSTRUCTION BASELINES)

INTERSECTION OR EQUATION OF TWO LINES

ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)

PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)

CLEARING LINE
SLOPE LINE
SLOPE LINE (FILL)

SLOPE LINE (CUT)

PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT)
FINISHED GRADE ELEVATION (RIGHT)

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	42249stdsymb1_2	42249	2	11

DRAINAGE

MANHOLE
CATCH BASIN — cb
DROP INLET — di
(existing) (PROPOSED)

DRAINAGE PIPE (existing) (label size & type)
DRAINAGE PIPE (PROPOSED)
UNDERDRAIN (existing) W/ FLUSHING BASIN — fb
UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN
show direction of flow (label size & type)
HEADER (existing & PROPOSED) (with stone outlet protection)
METAL or PLASTIC
END SECTION (existing & PROPOSED)
RCP
OPEN DITCH (PROPOSED)
EROSION CONTROL/ STONE SLOPE PROTECTION

BOUNDARIES / RIGHT-OF-WAY

RIGHT-OF-WAY LINE (label type)
RR RIGHT-OF-WAY LINE
PROPERTY LINE
PROPERTY LINE (COMMON OWNER) — Z
TOWN LINE — BOW / CONCORD
COUNTY LINE — COOS / GRAFTON
STATE LINE — MAINE / NEW HAMPSHIRE
NATIONAL FOREST
CONSERVATION LAND — LC
BENCH MARK / SURVEY DISK
BOUND — bnd (PROPOSED)
STATE LINE/ TOWN LINE MONUMENT — S/L T/L
NHDOT PROJECT MARKER
IRON PIPE OR PIN — ip
DRILL HOLE IN ROCK — dh
TAX MAP AND LOT NUMBER — 156 / 14 — 1642/341 — 6.80 Ac.±
PROPERTY PARCEL NUMBER — 12
HISTORIC PROPERTY — H

UTILITIES

TELEPHONE POLE
POWER POLE
JOINT OCCUPANCY
MISCELLANEOUS/UNKNOWN POLE
GUY POLE OR PUSH BRACE
(plot point at face not center of symbol)
LIGHT POLE
LIGHT ON POWER POLE
LIGHT ON JOINT POLE

POLE STATUS:
REMOVE, LEAVE, PROPOSED, OR TEMPORARY AS APPLICABLE e.g.:
R L P+04 25.0' T+04 25.0'

RAILROAD (label ownership)
RAILROAD SIGN
RAILROAD SIGNAL
UTILITY JUNCTION BOX — jb JB
OVERHEAD WIRE — OW (label type)

UNDERGROUND UTILITIES
WATER (on existing lines label size, type and note if abandoned) — W PW
SEWER — S PS
TELEPHONE — T PT
ELECTRIC — E PE
GAS — G PG
LIGHTING — L PL
INTELLIGENT TRANSPORTATION SYSTEM — ITS
FIBER OPTIC — FO PFO
WATER SHUT OFF
GAS SHUT OFF
HYDRANT
MANHOLES
SEWER — MHS
TELEPHONE — MHT
ELECTRICAL — MHE
GAS — MHG
UNKNOWN — MHU

TRAFFIC SIGNALS / ITS

MAST ARM (existing) — 30' MA (NOTE ANGLE FROM ℄)
OPTICOM RECEIVER
OPTICOM STROBE
TRAFFIC SIGNAL
PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT
SIGNAL CONDUIT — C PC
CONTROLLER CABINET — cc CC
METER PEDESTAL — mp MP
PULL BOX — pb PB
LOOP DETECTOR (QUADRUPOLE) (label size)
LOOP DETECTOR (RECTANGULAR) (label size)
CAMERA POLE (CCTV)
FIBER OPTIC DELINEATOR — fod FOD
FIBER OPTIC SPLICE VAULT — SVF
ITS EQUIPMENT CABINET — its ITS
VARIABLE SPEED LIMIT SIGN
DYNAMIC MESSAGE SIGN
ROAD AND WEATHER INFO SYSTEM

CONSTRUCTION NOTES

CURB MARK NUMBER - BITUMINOUS — B-1
CURB MARK NUMBER - GRANITE — G-1
CLEARING AND GRUBBING AREA — A
DRAINAGE NOTE — 1
EROSION CONTROL NOTE — A
FENCING NOTE — A
GUARDRAIL NOTE — 1
ITS NOTE — 1
LIGHTING NOTE — A
TRAFFIC SIGNAL NOTE — 1

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	42249stdsymb1_2	42249	3	11

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED — DATE
NEW DESIGN — JJN — DATE 12/2018
SHEET CHECKED — CAC — DATE 12/5/18
AS BUILT DETAILS — DATE

General Notes:

1) ALL OF THE PROPOSED WORK WILL BE WITHIN THE EXISTING R.O.W.
2) STREAMS WITHIN THE PROJECT LIMITS ARE IN THE 100 YEAR ZONE A FLOOD PLAIN.

WETLAND CLASSIFICATION CODES	
R2UB1	RIVERINE. LOWER PERENNIAL. UNCONSOLIDATED BOTTOM. COBBLE-GRAVEL
R4SB3	RIVERINE. INTERMITTENT. STREAMBED. COBBLE-GRAVEL
BANK	BANK
PEM1E	PALUSTRINE. EMERGENT. PERSISTENT. SEASONALLY FLOODED/SATURATED
PEM1B	PALUSTRINE. EMERGENT. PERSISTENT. SATURATED
PEM2B	PALUSTRINE. EMERGENT. NONPERSISTENT. SATURATED
PFO1B	PALUSTRINE. FORESTED BROAD-LEAVED DECIDUOUS. SATURATED
PSS1E	PALUSTRINE. SCRUB-SHRUB. BROAD-LEAVED DECIDUOUS. SEASONALLY FLOODED/SATURATED

LEGEND

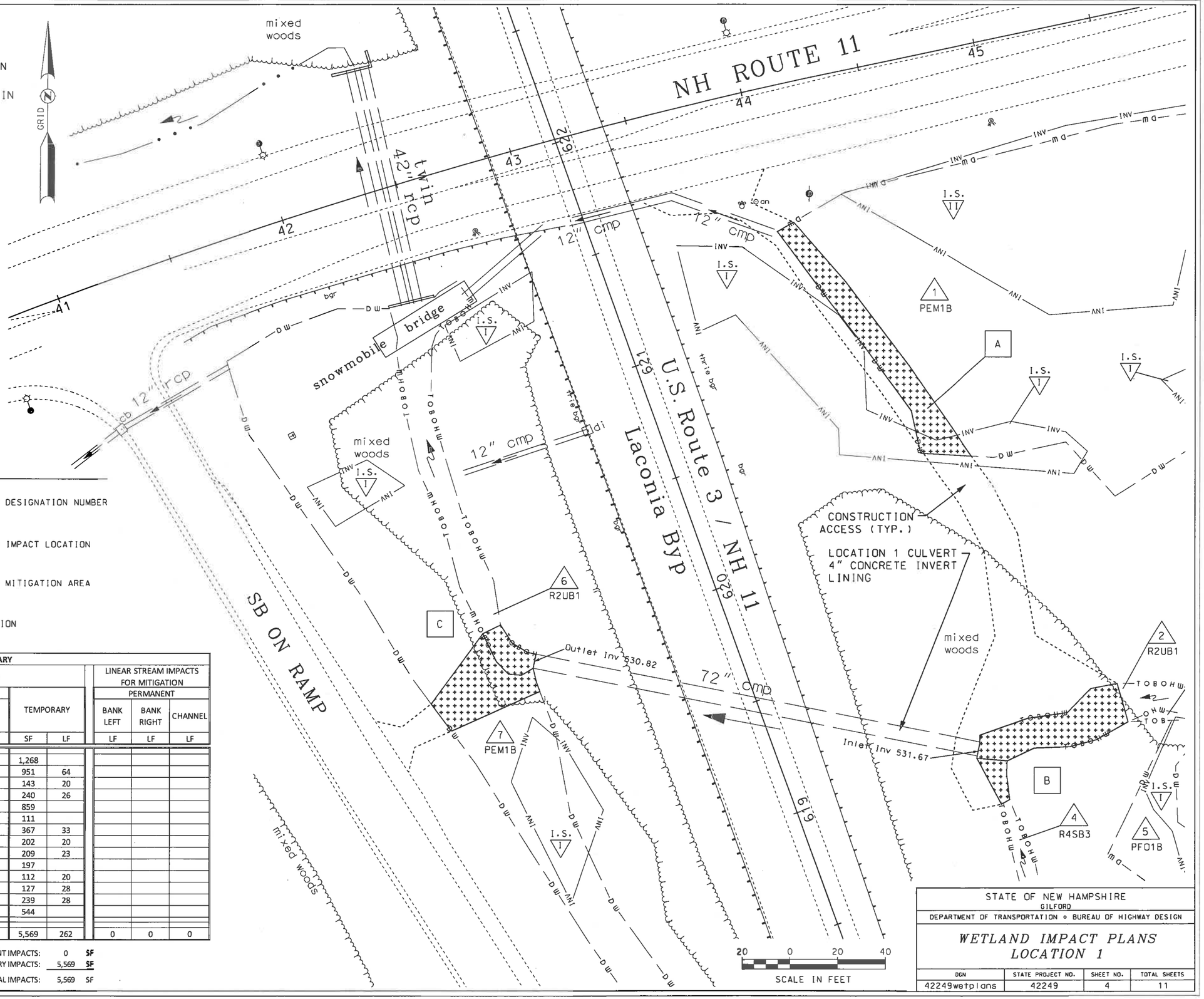
TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

- # — WETLAND DESIGNATION NUMBER
- # — WETLAND IMPACT LOCATION
- # — WETLAND MITIGATION AREA
- MITIGATION

WETLAND IMPACT SUMMARY

WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA IMPACTS PERMANENT N.H.W.B (NON-WETLAND) SF	N.H.W.B (NON-WETLAND) LF	N.H.W.B & A.C.O.E. (WETLAND) SF	N.H.W.B & A.C.O.E. (WETLAND) LF	TEMPORARY SF	TEMPORARY LF	LINEAR STREAM IMPACTS FOR MITIGATION PERMANENT BANK LEFT LF	BANK RIGHT LF	CHANNEL LF
1	PEM1B	A					1,268				
2	R2UB1	B					951	64			
4	R4SB3	B					143	20			
6	R2UB1	C					240	26			
7	PEM1B	C					859				
10	PEM1B	D					111				
11	R2UB1	D					367	33			
12	R2UB1	E					202	20			
12	R2UB1	F					209	23			
13	PEM2B	F					197				
14	R2UB1	G					112	20			
B1	BANK	G					127	28			
B2	BANK	G					239	28			
15	PEM1E	G					544				
SUB-TOTALS			0	0	0	0	5,569	262	0	0	0

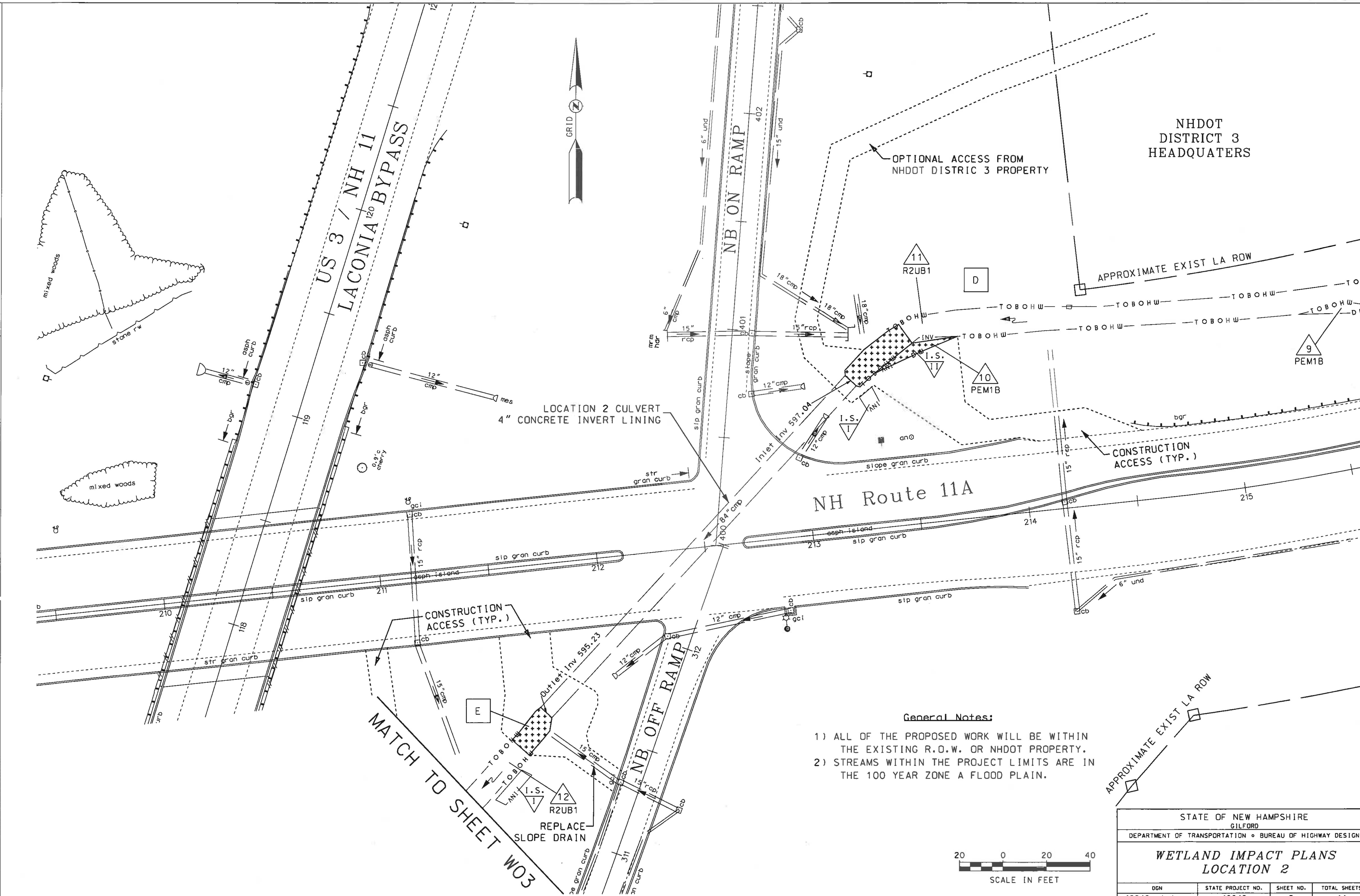
PERMANENT IMPACTS: 0 SF
TEMPORARY IMPACTS: 5,569 SF
TOTAL IMPACTS: 5,569 SF



STATE OF NEW HAMPSHIRE
GILFORD
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS LOCATION 1

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42249wetplans	42249	4	11



General Notes:

1) ALL OF THE PROPOSED WORK WILL BE WITHIN THE EXISTING R.O.W. OR NHDOT PROPERTY.
2) STREAMS WITHIN THE PROJECT LIMITS ARE IN THE 100 YEAR ZONE A FLOOD PLAIN.

STATE OF NEW HAMPSHIRE
GILFORD
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS
LOCATION 2

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42249wetplans	42249	5	11

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	STATION	DESCRIPTION

SDR PROCESSED		DATE
NEW DESIGN	JJN	DATE 12/2018
SHEET CHECKED	CAC	DATE 12/5/18
AS BUILT DETAILS		DATE

REVISIONS AFTER PROPOSAL

NUMBER	DATE	DESCRIPTION	STATION

	DATE
SDR PROCESSED	
NEW DESIGN JJN	DATE 12/2018
SHEET CHECKED CAC	DATE 12/5/18
AS BUILT DETAILS	DATE

STONE ROAD

SB OFF RAMP

SB ON RAMP

NH Route 11A

US 3 / NH 11 LACONIA BYPASS

MATCH TO SHEET WO2

CONSTRUCTION ACCESS (TYP.)

CONSTRUCTION ACCESS (TYP.)

REPLACE SLOPE DRAIN

REPLACE SLOPE DRAIN

41655 WETLAND IMPACTS

PROJECT 41655 CULVERT

LOCATION 3 CULVERT
4" CONCRETE INVERT LINING

Outlet Inv 588.78

Inlet Inv 592.23

16 PSS1E

15 PEM1E

14 R2UB1

12 R2UB1

13 PEM2B

B1 BANK

B2 BANK

F

G

mixed woods

hardwoods

broken end

GRID

SCALE IN FEET 20 0 20 40

General Notes:

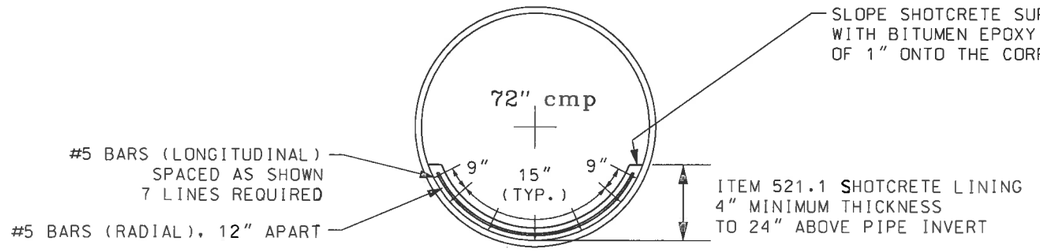
1) ALL OF THE PROPOSED WORK WILL BE WITHIN THE EXISTING R.O.W.
2) STREAMS WITHIN THE PROJECT LIMITS ARE IN THE 100 YEAR ZONE A FLOOD PLAIN.

STATE OF NEW HAMPSHIRE
GILFORD
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS
LOCATION 3

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42249wetplans	42249	6	11

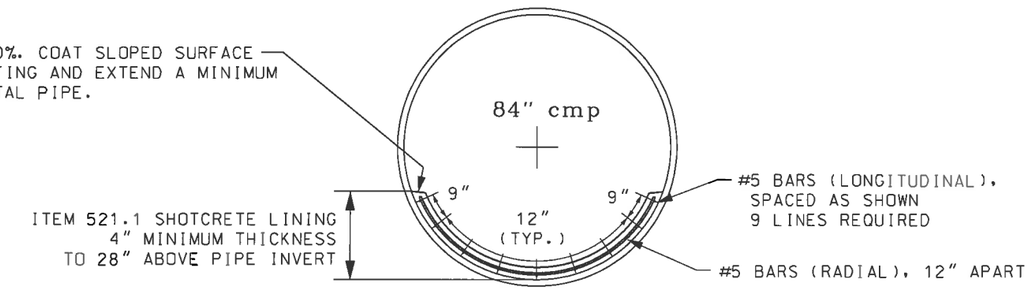
Existing
72" Structural Plate, 10 gage
6" x 2" corrugations



Location 1

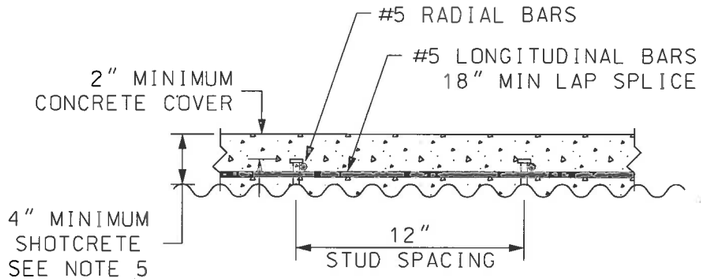
20 0 20 40
SCALE IN FEET

Existing
84" Structural Plate, 8 gage
6" x 2" corrugations



Locations 2 & 3

20 0 20 40
SCALE IN FEET

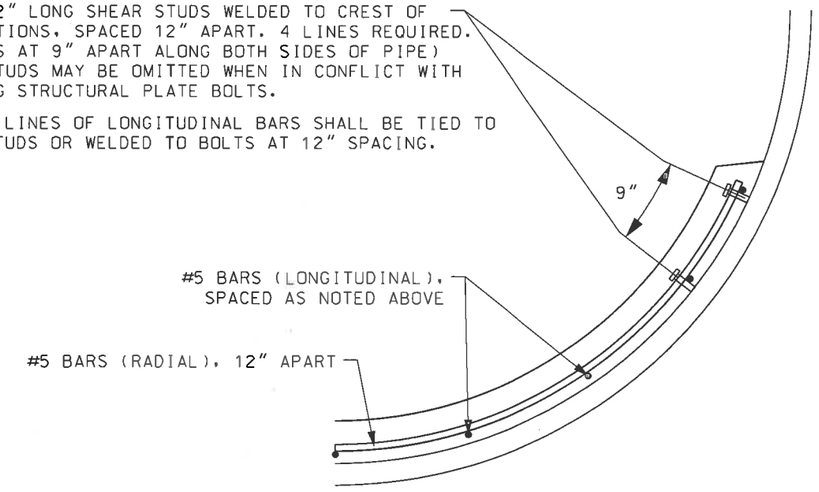


LONGITUDINAL TYPICAL SECTION

NOT TO SCALE

1/2" X 2" LONG SHEAR STUDS WELDED TO CREST OF CORRUGATIONS, SPACED 12" APART. 4 LINES REQUIRED. (2 LINES AT 9" APART ALONG BOTH SIDES OF PIPE) SHEAR STUDS MAY BE OMITTED WHEN IN CONFLICT WITH EXISTING STRUCTURAL PLATE BOLTS.

FIRST 2 LINES OF LONGITUDINAL BARS SHALL BE TIED TO SHEAR STUDS OR WELDED TO BOLTS AT 12" SPACING.



RADIAL TYPICAL SECTION

NOT TO SCALE

GENERAL NOTES

1. RESET EXISTING STONE (ITEM 583.002) AT INLETS AND OUTLETS AS DIRECTED TO MAKE A SMOOTH TRANSITION FROM EXISTING STREAM BED TO NEW CONCRETE INVERTS.

SHOTCRETE NOTES

1. SEE SPECIAL PROVISION FOR ITEM 521.1 FOR MATERIALS AND OTHER REQUIREMENTS.
2. SEE SUMMARY SHEETS FOR ESTIMATED MATERIAL QUANTITIES INCLUDED IN ITEM 521.1.
3. HEAVILY RUSTED AND SEVERELY PERFORATED PORTIONS OF PIPE SHALL BE REMOVED AS DIRECTED.
4. THE CONTRACTOR SHALL IDENTIFY VOIDS IN THE BACKFILL MATERIAL SURROUNDING THE EXISTING PIPE. VOIDS SHALL BE FILLED UNDER ITEM 520.32. SECTIONS OF MISSING INVERT MAY BE FILLED WITH WITH AN INITIAL APPLICATION OF SHOTCRETE, SUBSIDIARY TO ITEM 521.1.
5. SHOTCRETE THICKNESS SHALL BE 4" MINIMUM AND 4 1/2" MAXIMUM, MEASURED FROM THE CORRUGATIONS INWARD CREST.

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN CAC DATE 11/2018
SHEET CHECKED NAME3 DATE DATE3
AS BUILT DETAILS DATE

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

CONCRETE INVERT DETAILS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42249details	42249	7	11

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
   - 1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
   - 1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
   - 1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
   - 1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
   - 1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WQ 1500 REQUIREMENTS (HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM)
   - 1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.

2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
   - 2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
   - 2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
   - 2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
   - 2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
     - (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
     - (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
     - (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
     - (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
   - 2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
   - 2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
   - 2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
   - 2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30" AND MAY 1" OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
     - (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
     - (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
     - (C) AFTER NOVEMBER 30" INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
     - (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WQ 1505.02 AND ENV-WQ 1505.05.
     - (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WQ 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30".

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
   - 3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
   - 3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
   - 3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
   - 3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
   - 3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
   - 4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
   - 4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
   - 4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1" THROUGH NOVEMBER 30", OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
   - 5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
   - 5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
   - 5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
   - 5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
   - 5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:
   - 6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
   - 6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
   - 6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
   - 6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
   - 7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
   - 7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:
   - 8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
   - 8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
   - 8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
   - 8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:
   - 9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
   - 9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
   - 9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
   - 9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
    - 10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WQ 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
    - 10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
    - 10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
    - 11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
    - 11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
    - 11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
    - 11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
    - 11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
    - 11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
    - 11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
    - 11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
    - 11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
    - 12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500: ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
    - 12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
    - 12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
    - 12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
    - 12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
    - 12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
    - 12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.

13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
    - 13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
    - 13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
    - 13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
    - 13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.

14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
    - 14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
    - 14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1. IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
    - 14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WQ 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES[2]				ROLLED EROSION CONTROL BLANKETS[3]			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES[1]												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES'	YES'	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

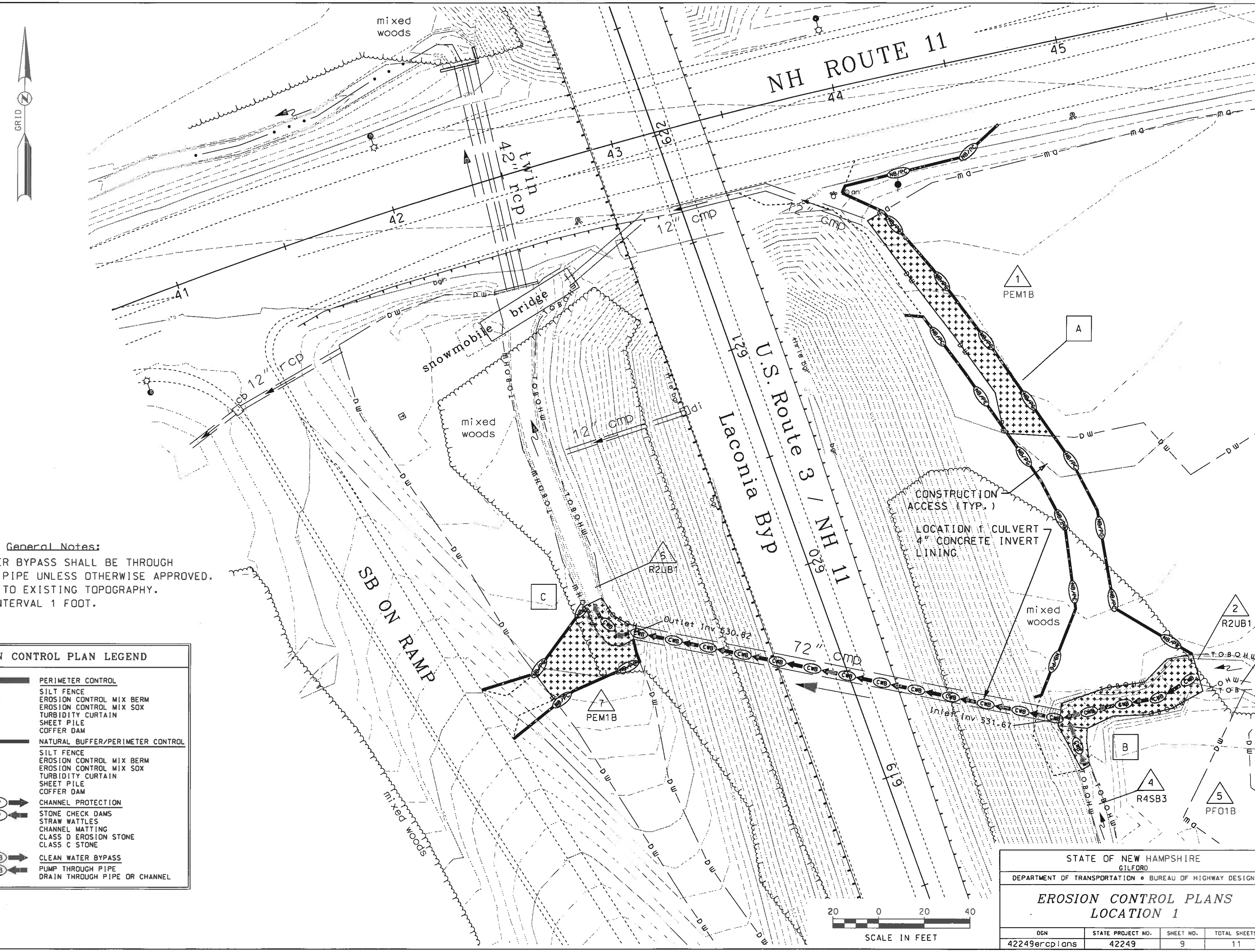
NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

EROSION CONTROL STRATEGIES

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	42249erosstrat	42249	8	11



General Notes:

1) CLEAN WATER BYPASS SHALL BE THROUGH EXISTING PIPE UNLESS OTHERWISE APPROVED.
2) NO CHANGE TO EXISTING TOPOGRAPHY.
3) CONTOUR INTERVAL 1 FOOT.

EROSION CONTROL PLAN LEGEND

PC — PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

NB/PC — NATURAL BUFFER/PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

CP — CHANNEL PROTECTION
- STONE CHECK DAMS
- STRAW WATTLES
- CHANNEL MATTING
- CLASS D EROSION STONE
- CLASS C STONE

CWB — CLEAN WATER BYPASS
- PUMP THROUGH PIPE
- DRAIN THROUGH PIPE OR CHANNEL

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN JJN DATE 12/2018
SHEET CHECKED CAC DATE 12/5/18
AS BUILT DETAILS DATE

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EROSION CONTROL PLANS
LOCATION 1

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42249ercplans	42249	9	11

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

SDR PROCESSED		DATE
NEW DESIGN	JJN	DATE 12/2018
SHEET CHECKED	CAC	DATE 12/5/18
AS BUILT DETAILS		DATE

US 3 / NH 11
LACONIA 120 BYPASS

NB ON RAMP

NHDOT
DISTRICT 3
HEADQUATERS

OPTIONAL ACCESS FROM
NHDOT DISTRICT 3 PROPERTY

APPROXIMATE EXIST LA ROW

LOCATION 2 CULVERT
4" CONCRETE INVERT LINING

NH Route 11A

CONSTRUCTION
ACCESS (TYP.)

NB OFF RAMP

MATCH TO SHEET ERC03

11
R2UB1

10
PEM1B

9
PEM1B

12
R2UB1
REPLACE
SLOPE DRAIN

General Notes:

1) CLEAN WATER BYPASS SHALL BE THROUGH EXISTING PIPE UNLESS OTHERWISE APPROVED.
2) NO CHANGE TO EXISTING TOPOGRAPHY.
3) CONTOUR INTERVAL 1 FOOT.

20 0 20 40
SCALE IN FEET

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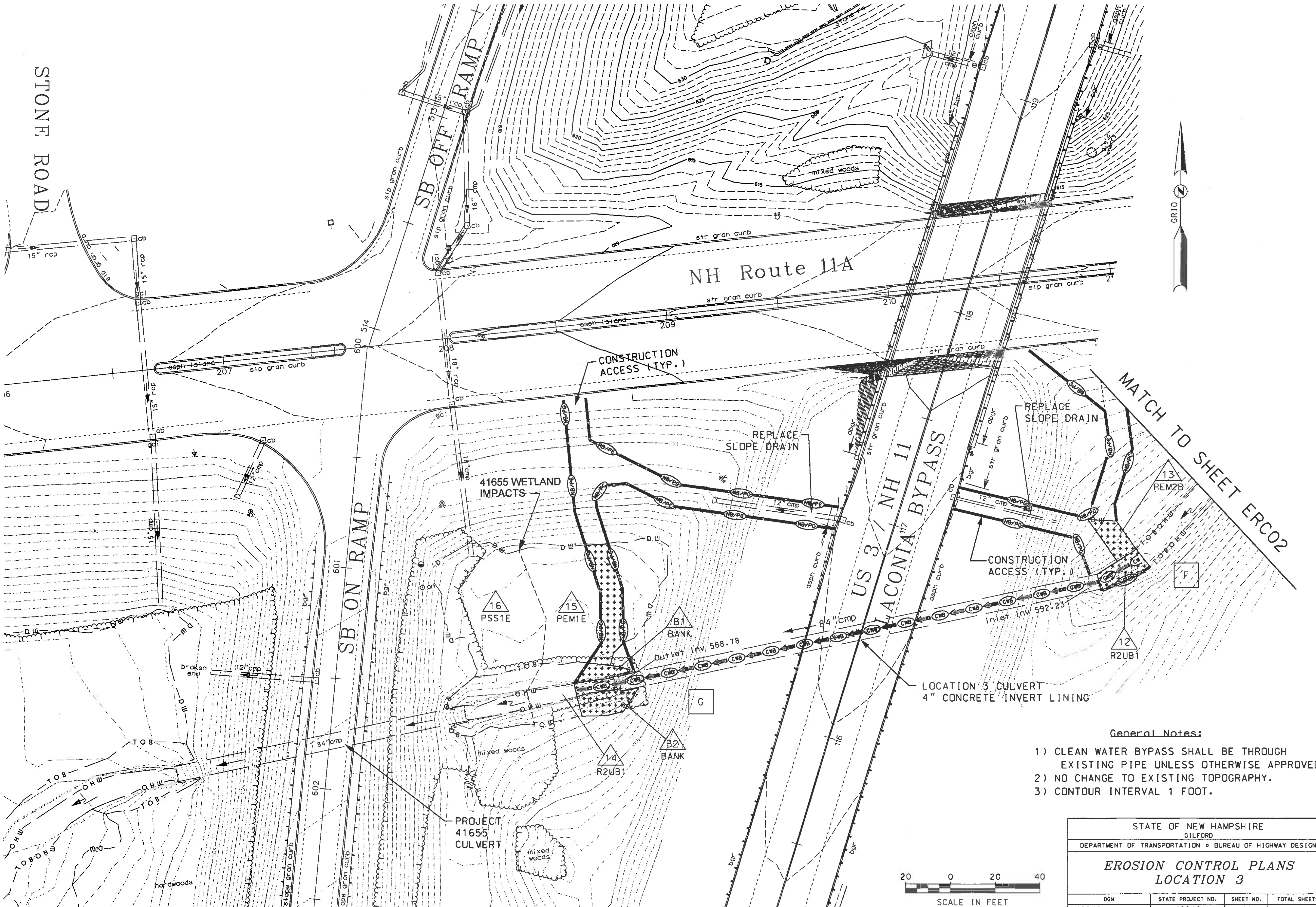
EROSION CONTROL PLANS
LOCATION 2

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42249ercplans	42249	10	11



<u>General Notes:</u>

1) CLEAN WATER BYPASS SHALL BE THROUGH EXISTING PIPE UNLESS OTHERWISE APPROVED.
2) NO CHANGE TO EXISTING TOPOGRAPHY.
3) CONTOUR INTERVAL 1 FOOT.

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EROSION CONTROL PLANS
LOCATION 3

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42249ercplans	42249	11	11

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	STATION	DESCRIPTION

SDR PROCESSED		DATE	
NEW DESIGN	JJN	DATE	12/2018
SHEET CHECKED	CAC	DATE	12/5/18
AS BUILT DETAILS		DATE	